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THIS USEFUL WORLD

by PAUL B. SEARS, I. JAMES QUILLEN,
and PAUL R. HANNA
Maps by ARTHUR H. ROBINSON

Scott, Foresman and Company
Chicago Atlanta Dallas New York

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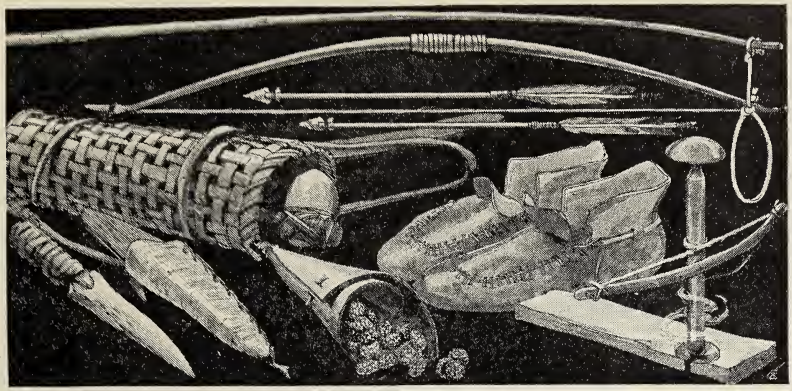
CHAPTER ONE

THE OLDEST WAY TO MAKE A LIVING



A man made these things so that he could live alone in the woods.

A Modern Man Tries an Old Way to Live

ON A RAINY August day, not so very many years ago, a group of men stood at the end of a road in Maine. Here the road became a path that led into the forest. One of the group was a man dressed only in a bathrobe. He said good-by to his friends and promised to meet them at this same spot in two months. Then he took off the bathrobe, walked down the path, and disappeared into the dark forest.

Two months later the friends drove to this same spot to meet the man who had gone into the forest empty-handed. There he was, waiting for them, his skin browned by the sun and wind, his muscles tough and hard from work. He was wearing clothes that he had made of deerskin. On his feet were moccasins of tough hide. In a bark sheath he carried a stone knife, and he had a bow and several arrows.

For sixty days this man had lived in the forest with no help from anyone, with no tools or weapons except those he could make for himself out of materials he found in

the forest. He had been able to find food enough to keep himself alive and healthy; he had made clothes; and he had built himself a hut.

The first day he had looked for water to drink and for nuts, roots, and berries to eat. With branches he made himself a safe place to sleep, and he gathered leaves for a soft bed. Then he studied this part of the forest to learn what there was in it that he could use.

There was a stream where he could catch fish, if he could make some kind of hook and line or weave a net of tough grass. There were small animals he could catch with his hands and larger ones he might kill with a stick or stone. With animal sinews and tough wood from a hickory tree he could make himself a bow and arrows. But first he had to have some kind of knife.

He spent hours hunting for a stone that would have a sharp edge when split. Many more hours he spent cracking and splitting stones against each other until he finally got one that was the right shape. When the tool was finished, he could use it to cut up the animals he killed and to make a bow and some arrows.

The second day he made a fire by rubbing a stick back and forth on a piece of very dry wood from a fallen tree. Then he could keep warm, cook his food, and make a light in the dark. In the fire he heated stones to drop into a boiling pit that he had dug. This pit was just a clay-lined hole in the ground filled with water from the stream, but it made a good cooking pot when the heat from the hot stones made the water boil.

During this time in the woods, this man was living as many people once did, thousands of years ago. To keep alive he had to use whatever he could find. He had to make use of the materials in the forest—the stones, the plants, the animals, the water. He used these things,

These pictures show six ways of lighting a fire. Perhaps some Boy Scouts and Girl Scouts can show the class how to make a fire with two sticks as shown in Pictures 1, 4, 5, and 6. Picture 2 shows the "pop-gun" way used by some Malays. Picture 3 shows a man striking sparks from rocks.

which we call resources, to provide himself with food, clothing, and a place to live.

All of us make use of these resources, too. The great difference between ourselves and this man who went into the forest is that we depend mostly on other people to supply us with the things we need. He had only himself. He had to find the right kind of stone for a knife, he had to make the knife, and he had to make a sheath to carry the knife, and a belt to hold the sheath. When we must have a knife, we can usually go to a store and buy one. But someone brought that knife to the store, other people made it, and still others cut the wood and dug up the ore that went into the handle and the blade.

Learning to Use Resources

MANY thousands of years have passed since almost all people lived as this man in the forest had to live, and men have found ways to use hundreds and hundreds of different materials. They have learned how to turn these materials, or resources, into things to use —into houses to live in, food to eat, clothes to wear, into things we must have in order to live, and things we like to have because they please us.

Men did not discover all at once how to use the materials that are in the world. Little by little they found ways to use first one and then another. We are finding more and more useful materials, and we are finding new ways to make old materials still more useful. For example, only lately men have learned to make thread for stockings of coal, air, and water. And it has been only a short time that men have known how to make a kind of rubber from oil.

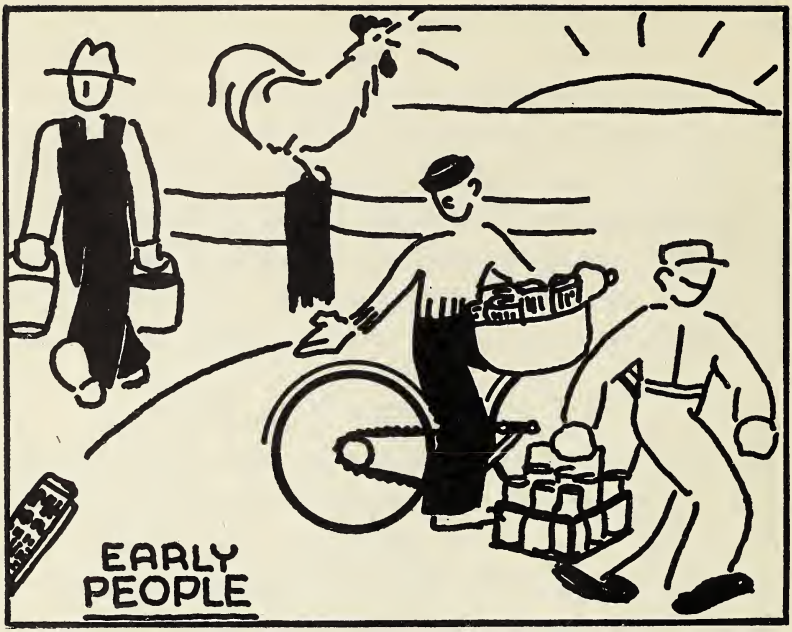
Before men could make the materials in the world useful, they had to learn many things. They had to learn

about animals and plants, about soil and other materials in the earth, about air and water, about weather, about rivers and oceans, about mountains, valleys, and deserts. As they learned more about the world and found ways to make the materials useful, they made themselves more comfortable. This book is about the resources of the world, about the materials which men have found useful. It tells where these materials are and how men have been learning to use them to satisfy their needs.

The Resources You Use

As you read the story of the man who went into the forest empty-handed to see if he could live without any modern tools and without help from anyone, you probably thought, "That must have been fun! I'd like to try that!" But did you stop to think of all the things you would have to get along without — things that you find necessary every day? Suppose you make a list of the things that you think you need in order to live. This list would include the things that you use every day — your clothes, your food, your transportation to school, your games, the things in your home and your schoolroom. It might help you in making such a list if you would think back to this morning when you got out of bed. You could think of the things you have used or needed all day.

When you have made your list, go back over it and after each thing you listed write the resource from which we get it. For example, you had certain things for breakfast. Put down the resources that supplied them. Besides, your mother needed a stove and cooking utensils to cook your breakfast, and you needed dishes and silverware in order to eat it. If you put down eggs, write chickens. If you put down cereal, write the kind of grain it was made from. So your list might read:



You probably know a lot of early people such as the farmer, the newsboy who delivers papers, and the milkman.

My Needs	*Resources That Supply My Needs*
Eggs	Chickens
Cereal	Wheat, oats, rice, corn
Milk	Cows
Oranges	Fruit trees

Have you ever played the game called *Animal, Vegetable, or Mineral?* One person tries to guess what the others have thought of. The only questions he can ask are those that can be answered with Yes or No, except the first question. For the first question he can ask "Animal, vegetable, or mineral?" If you have played that game, or one like it, you know that almost every *thing* you can think of can be described as animal, vegetable or mineral. Only a few *things* are hard to describe that way.

It might help you to understand the importance of plants, animals, and minerals, if you take the list you just

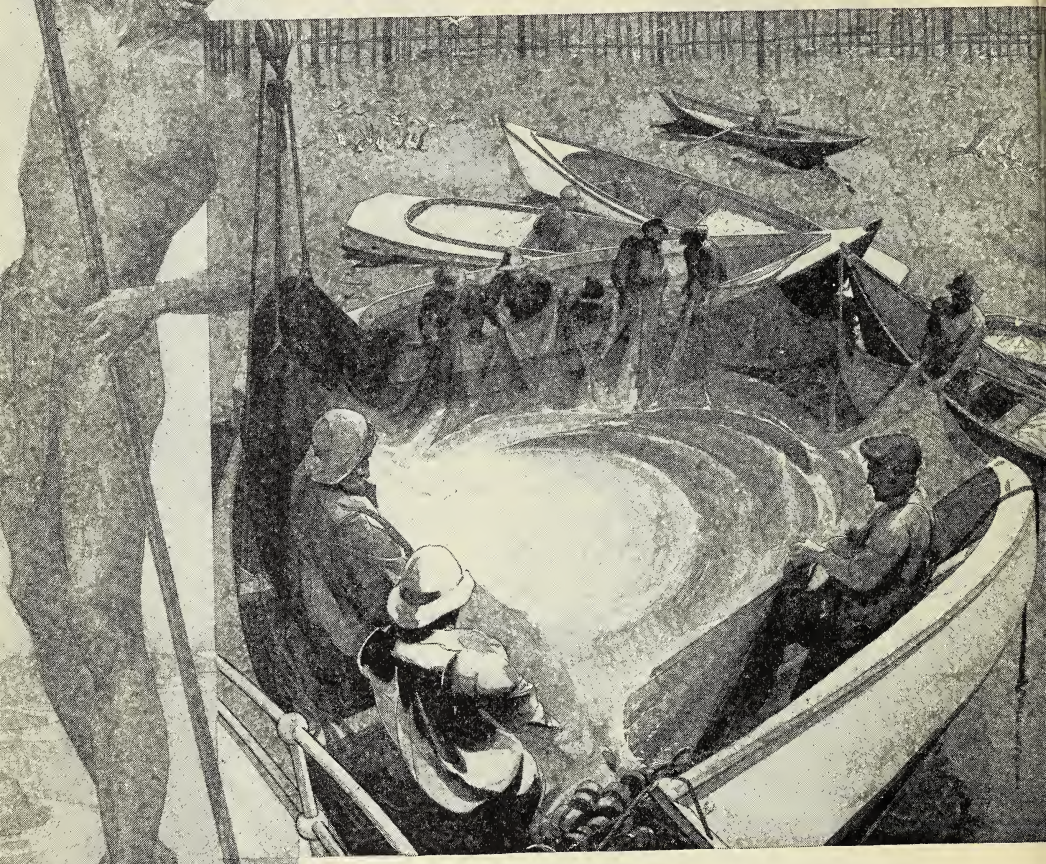
But the early peoples you will read about in this book are lots of people (peoples) who lived a very long time ago.

made and arrange it differently. Group the things according to whether they are animal, vegetable, or mineral.

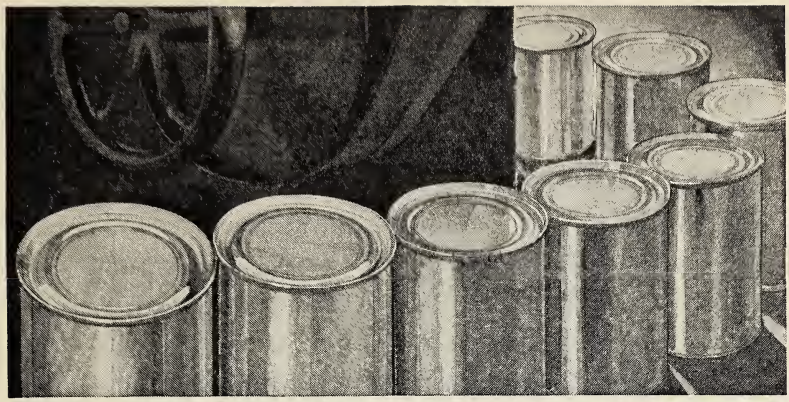
Animal	*Vegetable*	*Mineral*
Chickens	Wheat	Silver
Cows	Oats	Tin
	Corn	Iron

Have you read *Robinson Crusoe* by Daniel DeFoe? The story is about a man who was shipwrecked on an island, and it tells how he used the resources of the island to supply his needs. Some of you might like to read it and tell the class how Crusoe provided himself with food, clothing, and shelter. Others might like to read *Swiss Family Robinson* by Johann Wyss. It is a story something like *Robinson Crusoe.*

CHAPTER TWO



THE HUNTER



We do not have to be fishermen in order to have fish to eat.

The First Hunters

THE MAN who went into the Maine forest alone became a hunter. He made his living as almost everyone once did, thousands of years ago. In those far-away days people did not know how to grow plants or to raise animals on farms. No one had yet thought of doing that. Men had to hunt for their food, for materials to use in making clothes, and for a safe place in which to live.

When we call these early people hunters, we mean that they hunted for a living. Some hunted for four-footed animals and birds. Others hunted fish—we would call them fishermen today. Still others hunted for roots and berries and nuts—they were pickers and gatherers. Calling them all hunters is simply an easy way to describe the kind of life they led.

The early hunters learned how to make tools of wood, stones, and bones. The first tools were very simple ones, perhaps just a pointed stick, a sharp stone, and a splinter of bone. If you have ever cut your foot on a sharp stone, you can understand that a sharp stone

might be a better tool than no knife at all. And if you have ever tried to dig a hole in the ground with your hands, you know that a pointed stick or a bone is better than bare fingers for digging. Simple as they were, these first tools were a great help to early people in getting a living.

With the simplest of tools, the hunters of long ago were able to live more comfortably and with less work than before, because tools help a man with his work. These people did not need many things in order to live. The hungry man hunted for food until he found it. The man who needed clothes got himself an animal skin or gathered leaves to make some kind of garment. The family that needed shelter looked for a cave or perhaps made a hut of branches. People used what they found near by.

Men Begin to Want More and Better Things

Compared with us, the people of long ago needed very few things. Here we are today, wanting hundreds of things—radios, stoves, hats, bicycles, spoons, marbles, purses, ladders, baseballs, movies—more things than we can name. How did people come to want so many different things if they could once get along with just a few?

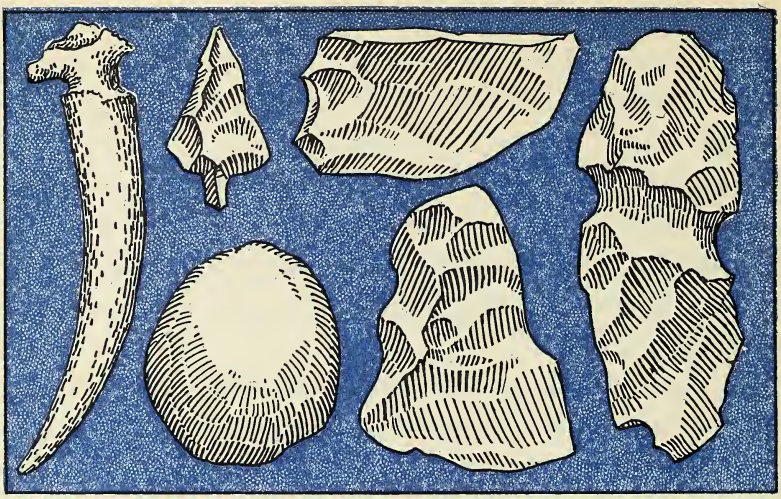
In time the people of long ago began to want other things besides just food, clothing, and a place to live. And when men want something badly enough, they find a way to get what they want. And having new things made them want more things. This is not so very strange when you think about it. For example, a boy wants a bicycle. He usually says that he won't ask for anything else if he gets the bicycle. But when he does

get it, he soon finds that he needs a light, a siren, or perhaps a tool kit. He wouldn't need them if he didn't have the bicycle. Having the bicycle means having more needs.

Father may say, "That boy wants something all the time," but we know that people have been just like that for thousands of years. They have been making or getting new things that have made them need or want still other things.

There seems to be something about people that makes them want better things. And there are always people who can think up new ways of doing things, who can invent new tools and find ways to use new materials. It was such a person who first thought of tying something sharp, perhaps a sharp stone or a splinter of bone, to the end of a stick and so made the first spear.

This statue in a museum shows a man of long ago making a stone tool. He is making it in what was then a new and improved way. He is rubbing the stone tool against a rock in order to grind and polish it into a better shape than the rough stone had.



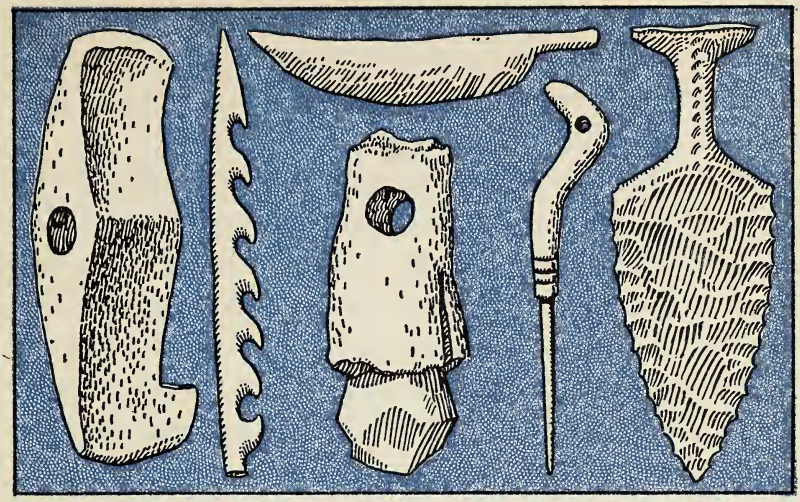
The tool at the left is a knife made of deer horn. The other tools are made of stone. At the top are an arrow head and a scraper. At the bottom are a hammer and a hatchet meant to hold in the hand. At the right is an axe that was made to be tied to a stick. All the tools were made long ago by savages that we call "early peoples."

Perhaps the first tool to be improved was not a spear but a hatchet, or kind of hammer, made by fastening a heavy, sharp stone to a short stick. Or perhaps it was a fishhook made of bone. Other hunters saw that the fishhook and the hatchet were good and wanted tools like them. Then by and by men began to want better tools than just sharp sticks and pieces of stone and bone.

The Weapons of Early Hunters

IMPROVED tools were a help in making a living. Most of them were tools used for killing. Such tools are called weapons. In different parts of the world men learned how to make bows and arrows, spears, fish nets, fish spears, and many weapons that would help them in hunting.

In Australia, the hunters of long ago had to find ways to kill the fast-moving kangaroo, darting birds, and



These tools were more carefully made by early peoples than the ones shown on page 16. The stone tools are smoothed and polished. Perhaps you can decide which two were made of bone. The heavy hammer in the middle is set in a block of wood and once had a stick for a handle. The stone axe also has a hole for a handle.

swift desert animals. Instead of the bow and arrows, which were used in many other parts of the world, the Australian hunters learned to make the boomerang—a special kind of throwing stick that comes back to the thrower if it misses.

In other parts of the world hunters learned how to make slings out of pieces of leather. With a sling the hunter could throw a stone very hard and straight. Slings were used in Bible times and much later. Perhaps you have read how David killed the giant Goliath with a stone from his sling. David had learned to use a sling when he became a shepherd boy, because shepherds used slings in order to kill wolves and jackals.

The kinds of weapons that hunters invented depended on several things. First, they depended on the kind of animals people could find. The fisherman had no reason to invent a boomerang, because it would not have helped

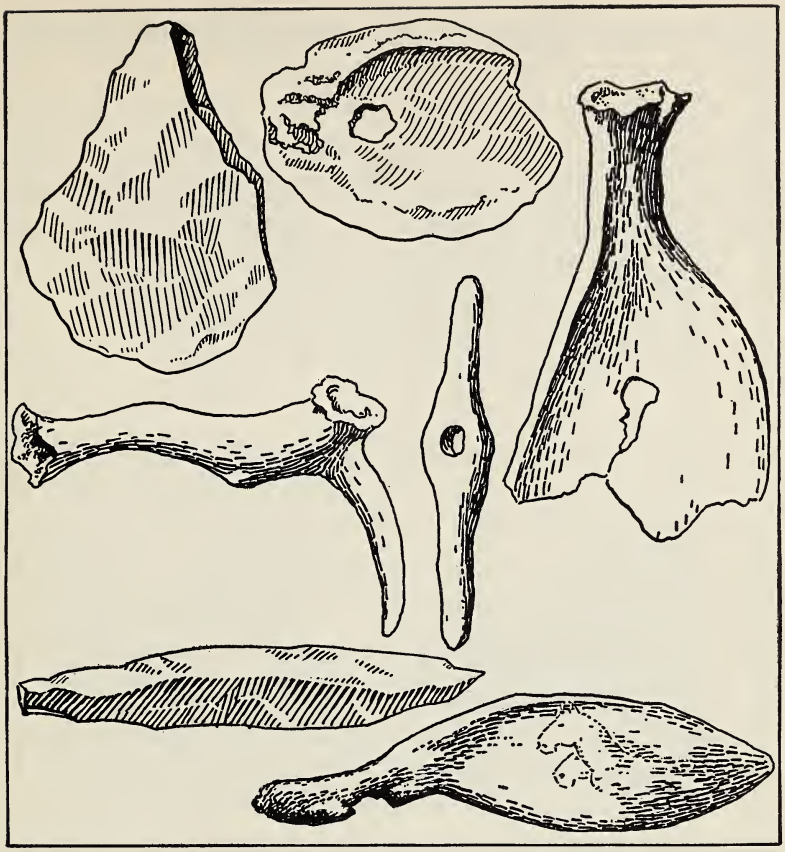
him to catch fish. The man who spent a lot of time hunting birds had no reason to invent a fish spear. Men invented new weapons and improved old ones so that they could do their work of hunting better.

The kinds of weapons that hunters invented also depended on the kinds of materials they could find. The man who lived along the shore of the river or ocean was likely to use shells when he wanted a sharp-edged tool. But the man in the forest, where there were no shells, looked for a sharp stone or a piece of hard, split bone. The kinds of materials in a place made a great difference in the sorts of tools men could make. The kinds of materials also made a great difference in what they ate, what sort of homes they lived in, and what they wore.

Men did make one discovery in many parts of the world. In some way or another, peoples all over the world learned to make fire. No one knows just when this happened, or how, but it must have been long, long ago, even before men learned to improve the first simple tools. With fire, men could keep warm, cook food, make a light, and frighten away dangerous animals. Later on men discovered other ways in which fire could be useful.

Life Was Not the Same Everywhere

We know that people of today do not lead the same kinds of lives all over the world. Neither did the people of long ago. The fisherman who lived along the shores of a stream or lake, or by the ocean did not eat the same kind of food as the hunter who lived in a forest and killed deer and bears. The forest hunter could make his clothes of deerskin, but the fisherman had to hunt for some other material, perhaps marsh grass or the skins of seals. Men had to use the materials they found in the place where they lived. Different animals and



These tools were made by early peoples who used materials that they found near home. The three tools at the top are hoes, but each is made of different material. The first is stone, the next is shell, and the third is a big piece of bone. The next two tools are picks. One is made of deer horn, the other of stone. At the bottom of the picture are two knives. One is made of flint, the other of bone. The last one has a picture drawn on it, which shows that among some of the early peoples there were artists who could draw animals.

materials meant different foods, clothes, and tools—different ways of living.

Thousands of years ago groups of people all over the world were living by hunting. But you must not think that they all led the same kind of life. Their homes were not the same, their foods were not alike, and their

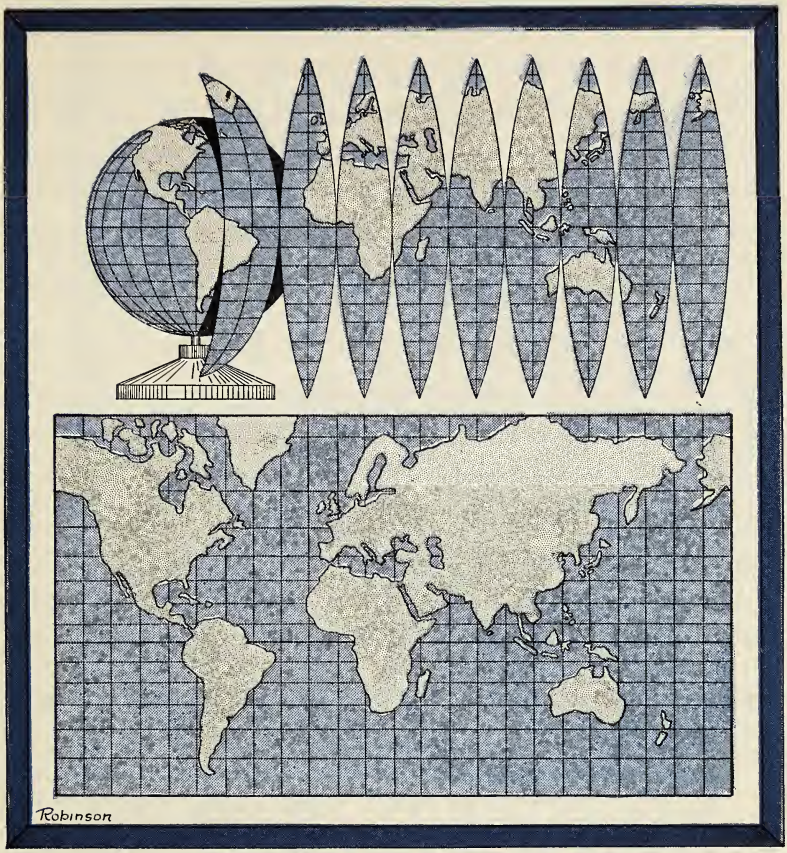
clothes were different. They had different tools and weapons and different ways or customs.

To understand something of these different ways of living, it will be necessary to learn a little about the earth, the kinds of places where people live, and also something about the kinds of weather these places have.

The Earth and Its Parts

SUPPOSE you look at a model of the earth. A model of the earth is called a globe. The globe shows how much of the earth is covered with water and how much is land above water. Parts of the earth that are covered with water are usually shown in blue on globes and maps. When you look at the globe, you can see that most of the land above water is in the northern part, which is the upper half of the globe. Most of the water is in the southern part. In all maps that are drawn the right way, the top part of the globe is the north; the bottom part is south.

A globe is the best way to show the shape of the earth and its parts.



A map is a way to draw or to print what is on the globe. This is not an easy thing to do. You will see why if you draw a picture on an orange and then peel the orange. Before peeling, cut the orange peel in pieces like the ones you see in the top part of this diagram. Take off the peel and spread out the pieces. Can you bring the picture together again? Or will you have to draw it over?

The larger pieces of land shown on the globe are called continents. They are North and South America, Europe, Asia, Africa, and Australia. Sometimes Europe and Asia together are called Eurasia. Besides these there is a large continent at the South Pole, called Antarctica.

In addition to the continents, there are thousands and thousands of islands. Some, for example, Greenland, are

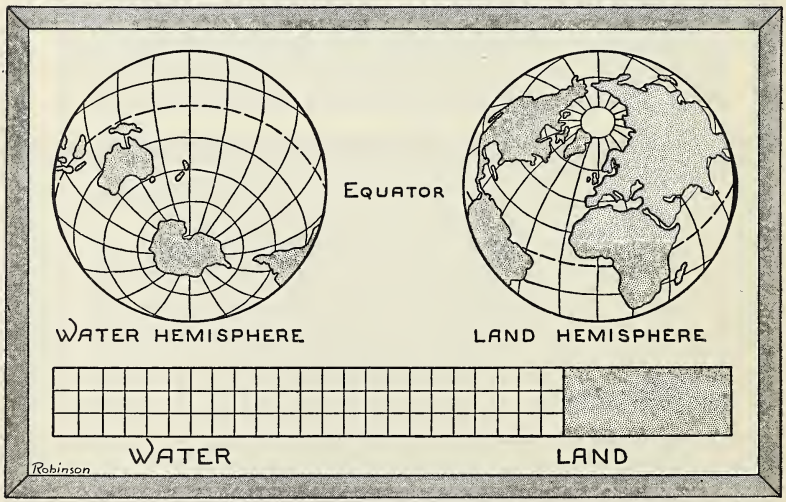
very large; others are so small that they are just pin-points on the globe or map. Many are too small to be shown.

Although there is a great deal of land shown on the globe, most of the earth is covered with water. Only about one-quarter of the earth is land above water, as the diagram on this page shows. All this water—oceans, seas, lakes, and rivers—has a great deal to do with the weather.

Oceans, Seas, and Lakes

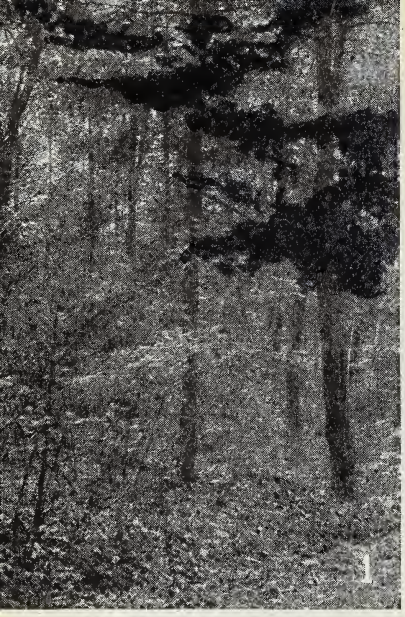
THE BIGGEST bodies of water are called oceans. There are the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, and the Arctic Ocean. There are seas, the Mediterranean, the Caribbean, and many others; you will find the most important ones named on maps.

Besides these bodies of water, there are bays and gulfs, and lakes, too, both of salt water and of fresh. Flowing

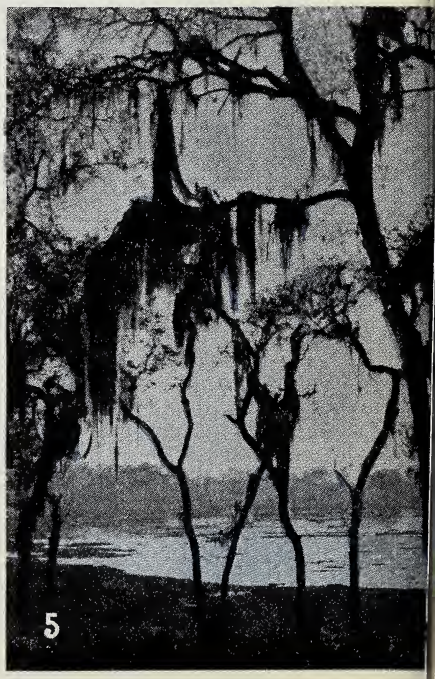


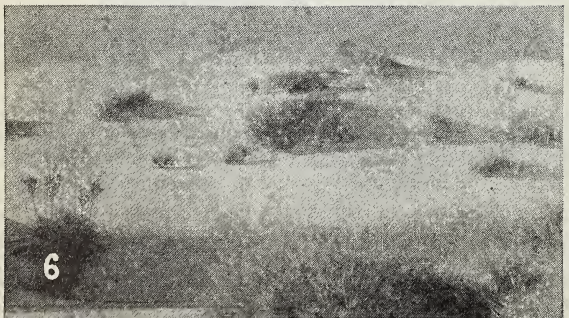
Hemisphere means "half a sphere," or "half a globe." The world can be divided into a Northern Hemisphere and a Southern Hemisphere. Or it can be divided into an Eastern Hemisphere and a Western Hemisphere. There are also the Land and Water Hemispheres shown in this diagram. The lower part of the diagram shows how much of the earth is covered with water and how much is land above water.

This map shows the oceans and continents of the world. If your class has a large wall map, you can use it to locate the Antarctic continent and the Arctic Ocean which are not shown on this map.



Picture 1 was taken in New York, Picture 2 in Ohio, and Picture 3 in Nebraska. Picture 4 was taken in Wyoming, Picture 5 in Florida, and Picture 6 in Nevada. You might locate these states on a wall map. Would you expect the same kind of weather in each?





into these bodies of water are rivers and streams of all sizes, small and large.

Weather and Climate

All of us know something about weather—warm weather or cold weather, rainy weather or dry weather—all kinds of weather. But many people are not sure about the difference between weather and climate. We have some kind of weather every day and often speak about it. But we do not meet people and say, "Nice climate today." Climate is the kind of weather in a place, not every day, but all year long and every year. A place that has many days of rainy weather and moist air has a wet climate. Other places where there is much less rainy weather may have dry climates. There are places with hot climates and places with cold climates. Sometimes we describe the climate of places by talking about the temperature and the moisture. We say they are hot and wet, hot and dry, or cold and wet, or cold and dry. Then there are places where the climate is in between, neither hot nor cold, just warm; neither wet nor dry, just moist. You can see that there are many kinds of climate.

The climate of a place is important because upon it depend the kinds of things that grow there. Climate also has a lot to do with the amount of things that grow. Climate was important to the man who went into the Maine woods to live for two months. It was important because he had to have clothes and a shelter that would be suitable. It was important in other ways you may think of. Climate was important to the hunter, thousands of years ago, because it made a difference in the kinds of animals and plants that grew where he lived. Climate made a difference in the way he lived, in the

kind of clothes he wore, and the kind of house he made. It is important to the farmer today, because the farmer has to grow the kind of crops that will do well in the climate where he lives. It is important to all of us because it makes a difference in the foods we eat, the clothes we wear, and the houses we live in.

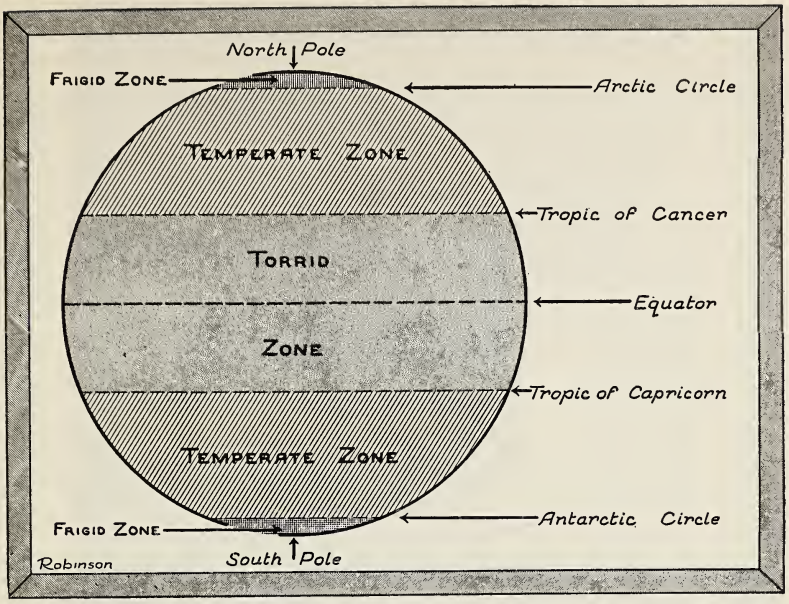
Different Kinds of Climate

It is fairly easy to learn something about hot and cold climates, about parts of the earth that are hot, cold, or warm. Some globes are marked to show these parts of the earth. On some of them you will find the cold places marked "frigid zone," the warmer places marked "temperate zone," and the hot places marked "torrid zone." Zone means a belt, or a strip, of land; frigid means very cold; and torrid means very hot.

Look at your globe and find the places called North Pole and South Pole. The land and the water there are covered with ice fields all the year. You probably know already that these places are very cold.

Half-way between the poles a line is drawn around the globe. This line is called the Equator. The land and water along the Equator get much more heat from the sunshine than land and water at the poles. It is hot along the Equator. Other lines have been drawn to show about how far north and south the torrid zone is. And there are still other lines that show how far from the Poles the frigid zones reach. In between are the temperate zones.

Of course these lines are just imaginary lines that have been drawn on maps and globes. Really it isn't very easy to divide the earth into places where the climate is hot, cold, and warm, just by drawing straight lines on a map. Men who study the weather have an-

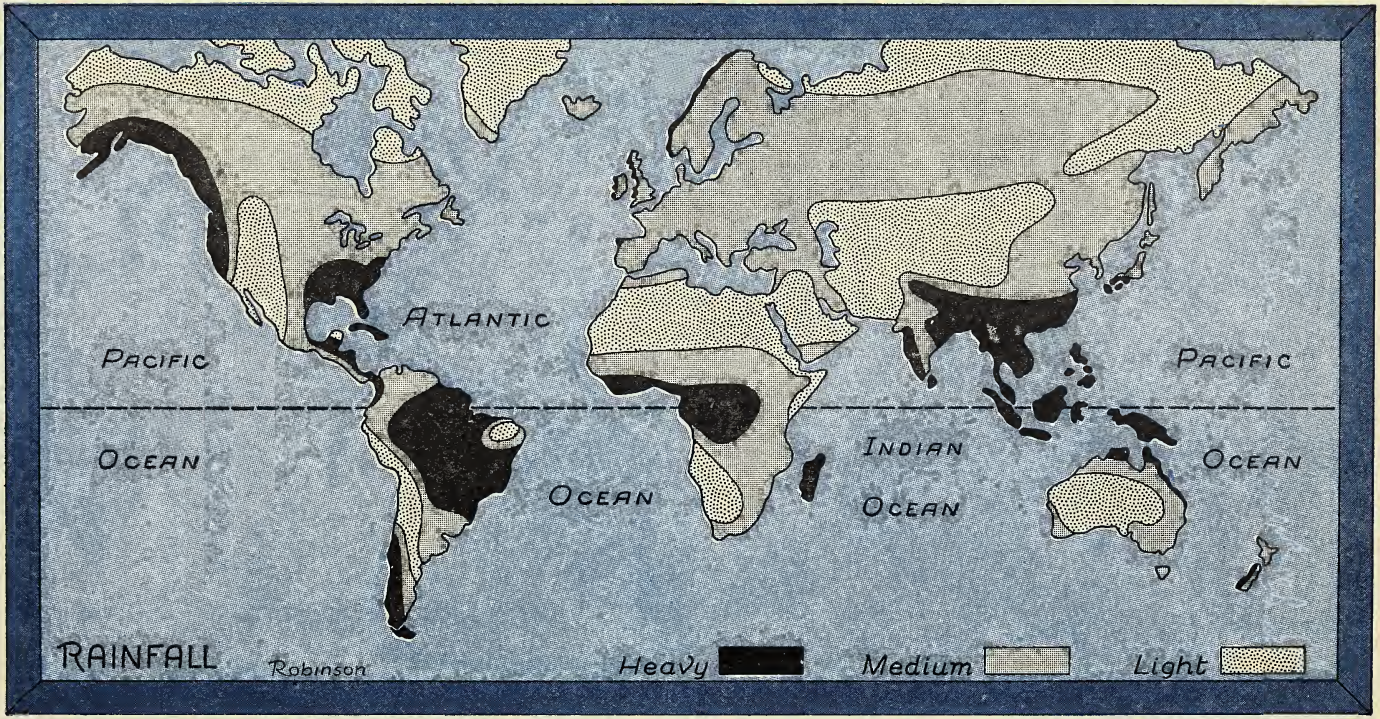


This diagram shows how lines are drawn on the globe to divide the earth into zones. The lines, which you can find on your globe, have names. The names are also shown on this diagram. One is the Equator. Two are called Circles and two are called Tropics.

other way of showing these regions on maps. One of these maps is shown on page 29.

But just dividing the map with lines or marking a globe with lines to show hot and cold places is not enough to tell what the climate is. You already know that rains have something to do with climate. Most jungles are hot, and so are many deserts, but these places do not have climates that are alike. The great difference is in the amount of rain that falls and in the dryness of the air. The jungle gets a great deal of rain, while the desert gets almost none. And so we will need another set of maps to show where rain falls and how much of it there is in different regions.

One of the first things you should notice about these maps, called rainfall maps, is that in every continent



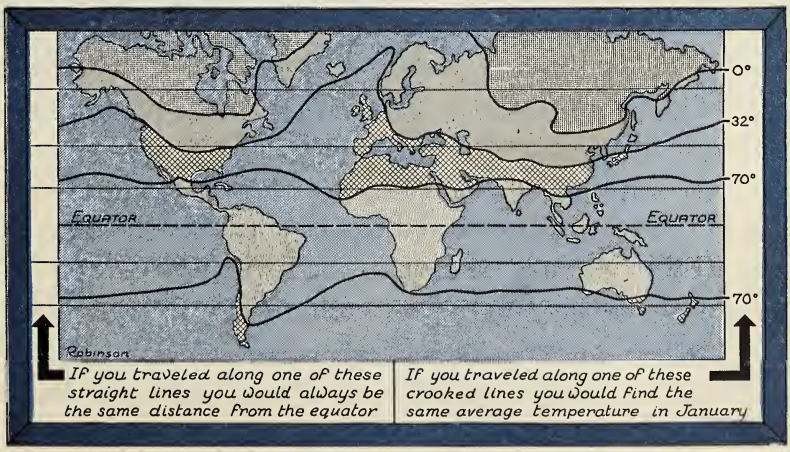
On this map, called a rainfall map, find the region where you live. The map will show you whether your region has a lot of rain in a year, only a little rain, or a medium amount of rain in a year.

there are places where very little rain falls. You would expect to find deserts in such places, and you would be right. Then there are places where a lot of rain falls, and in those places you are likely to find forests. And then there are places that are neither very wet nor very dry, but in between. You would not expect to find the same kinds of trees and other plants, or so many, growing in those in-between places as you would expect to find in the wet places. But you would expect to find more plants than you would in the dry places.

Suppose we look at a part of North America and see what differences climate makes in various parts of that continent. We will start with a part of the country along the Atlantic Ocean.

The Forests

Some of the Indian hunters who lived in North America before the white men came had their homes near the ocean in the eastern part of the continent. Near the ocean there is usually plenty of rain and the air is moist. Trees grow very well in such a place. In Indian times most of this land was covered with


0°
32°
70°
EQUATOR
EQUATOR
70°
Robinson
If you traveled along one of these straight lines you would always be the same distance from the equator
If you traveled along one of these crooked lines you would find the same average temperature in January

This kind of map is called a "vegetation map" because it shows the kinds of plants, or vegetation, that grow in different places. This map of part of North America also shows some mountains. When you look at a map like this, remember that all the land in one region is not covered with trees nor all the land in another region covered with grass. The maps show you what you are likely to see if you visit that region.

forests. Here and there were open spaces without trees. The ground might be too swampy or too dry for trees. Or the Indians might have cut and burned the trees in order to have corn fields.

Some Indians who lived along the shore of the ocean gathered oysters and clams to eat. For centuries they threw the shells in piles near their camp fires. Even today there are great heaps of these shells in some places. Mixed with the shells are bones of animals, ashes from old fires, bits of pottery, and stone tools that the Indians lost or threw away. Men who want to study the life of these Indians dig into the old shell piles to see what they can find.

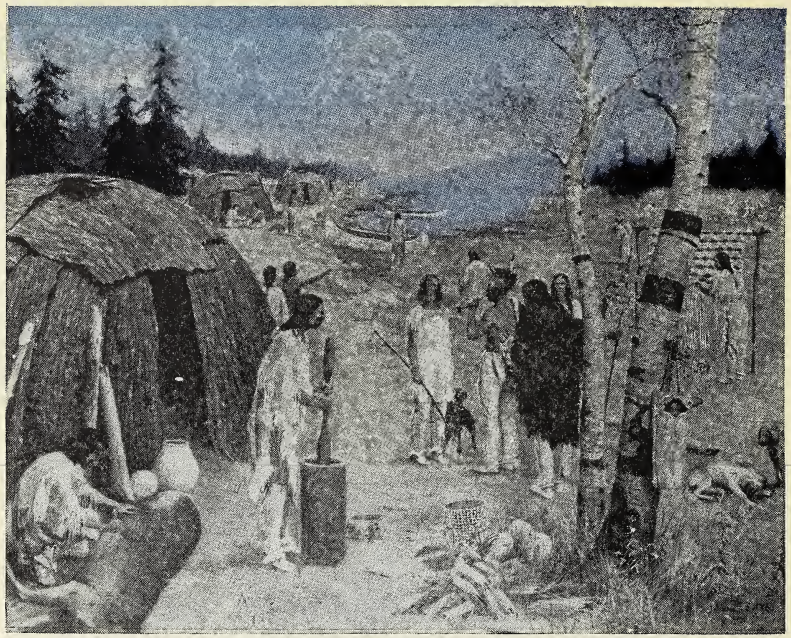
From the bones found in the shell piles we have discovered that these Indians also caught fish in the

rivers and ocean. They hunted and killed animals of the forest such as squirrels, deer, beavers, and birds. They not only got flesh for food and skins for clothing from these animals, but they used the bones to make fish-hooks, needles, chisels, and other tools.

With these tools the Indians probably made many articles of wood, but we cannot be sure about this. Wooden articles decay, and we do not find many wooden things in the shell piles.

The whole life of these Indians was spent in the forest and near the water. They made a living by using

The shell heaps and trash heaps that Indians and other early peoples left are something like our garbage dumps and junk piles. On top we can find parts of autos and radios like those used today. Farther down are parts of buggies, old-fashioned talking machines, and other things that people used and then threw away ten or twenty years ago. If you dug down far enough you might find the kinds of things used by people in your great-grandfather's time. Men who study early peoples dig into the trash heaps they left and find what is left of many things these peoples made and used.



This picture, and others like it on the next few pages, came from a museum that has many pictures and models of Indian life. This one shows the life of woodland Indians. If you make a careful list of the things you can see in this picture, you can easily make a second list of the resources these Indians used. For example, there is a pile of corn at the foot of a tree, a dead deer, a bark house, a birch-bark canoe, a corn pounder, a loom, and many other things the Indians made by using resources found close by.

the wild things that they found near their homes. They had found ways to get these animals and plants and to use them for food or in making clothing and houses. The life of the Indians depended on the living things around them, on the plants and animals of the forest and the seashore.

Prairies

If one of these forest Indians started on a long journey westward away from the ocean, he would travel many days through the forest, finding fresh, clear streams

and plenty of fish and forest animals. At first he would feel at home, because the surroundings would not be much different from those along the ocean where he lived.

Gradually the land would get rougher, he would find more tumbling streams, and in the distance he would see round-topped mountains. Most of them were covered with forests, but once in a while he would see a bare peak. The steep sides of the mountains were a tangle of shrubs and small trees, but here and there he would see the jagged rocks.

As this Indian journeyed west, he would cross over the forest-covered mountains and come to land that was different. He would notice that the trees were more scattered and that there were more and more grassy places. He would have wide rivers to cross and would come to stretches of land covered with long waving grass.

At last, after many days of travel, he would come to the land of the prairies. Here he would see kinds of animals that did not live in the eastern forests—the bison, which we call the buffalo, the prairie chicken, jackrabbits, prairie dogs, and others.

If this forest Indian met other hunters—and if they did not kill him as an enemy—he would think that they had strange ways of living and hunting. He would find whole camps of people following the herds of wild buffalo, killing and skinning them, drying strips of meat in the hot sun for food during the winter. He would find these people gathering kinds of berries and other fruits that were new to him and digging into the prairie earth for roots that were strange to him. He would find the prairie Indians using buffalo robes and hides instead of the soft deerskin of which his own clothing was made.

This picture of a museum model shows the winter home of some Sauk Indians who lived in Iowa. A part of the grass hut has been cut away so that visitors to the museum can see the inside of the model. The Sauk Indians once lived in the Michigan forests but were driven out by fiercer woodland Indians. When the tribe moved into Iowa, they had to learn different ways of living because the resources were different. This picture shows one of the new ways they learned when they could not get bark to build houses. What other new ways do you think they had to learn?

The homes of the prairie Indians were different from those of his own people. He had been used to bark houses in the eastern forests, but these people had tepees of poles covered with buffalo hides. The tepees could be taken down and the hides rolled up whenever the tribe decided to follow the buffalo herds.

The Indian from the eastern forests could see that these people lived differently from his own people because they lived in a different kind of place, with different animals and plants.

This museum picture shows some Dakota Indians that followed herds of buffalo for a living. Read about these Indians in an encyclopedia and in other books and then make a list of the different resources these Indians used in their life on the plains.

The Dry Plains

If our hunter kept on traveling west, away from the Atlantic Ocean, still farther on he would find another kind of land, the dry plains. The change from the prairies to the plains would be gradual, just as the change from forest to prairie was gradual. He would find fewer springs of water and come to rivers that were almost dry in the summer time. He would find trees growing only along the banks of the streams.

As the Indian journeyed on, he would see that the grass was shorter and bunchier, growing in little patches or clumps. The air would be drier, hotter in summer and colder in winter than he had been used to, and not

The tribe of Apache Indians shown in this museum model lived close to the mountains at the edge of the Great Plains. How do their homes show that they made use of different resources than the plains Indians pictured on page 35? What other resources does the picture show them using? Perhaps you can name others.

much rain would fall for many weeks. Herds of swift antelope would appear.

If our forest hunter decided to stay on the plains, he would have to change his ways of living and hunting and become like the plains Indians. He would have to learn to live in a tent, to build his fires without any wood, and to hunt in open country. Many of the ways that he had learned at home would not be much good to him on the plains, because so many things would be different. Different climate, different animals, and different plants would mean that he would have to live in a different way.

Mountains

If our Indian traveler kept on toward the west, he would notice mountains in the distance. Probably he would see that they were different from the moun-

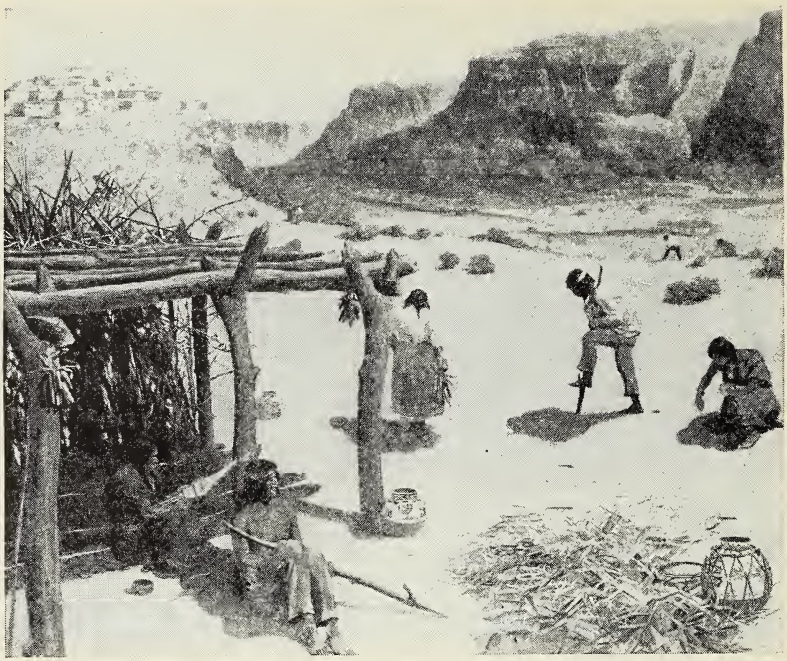
tains he had crossed while he was still in the eastern part of the continent. Those had been covered with forests, but many of these mountains were bare and rocky. If he passed that way in summer, he would find few streams. Those he crossed would probably be shallow, flowing along in rocky beds full of boulders and smaller stones. In the spring these streams would be running bank-full, too swift to cross. The melting snow on the mountains would fill these streams with water only for a few weeks.

The Unfriendly Deserts

If the Indian hunter made friends with the Indians of the mountain region, he might learn to talk with them in the sign language. They might tell him about the dry deserts, still farther west, where for months, even for years, there might be no rain. He would learn that the plants of the desert are thorny, dry, tough, and grow far apart. Perhaps a wise old hunter would tell him about the plants that store up water in their thick leaves and stems, and how to get that water when he was thirsty.

Our traveler would learn that the desert has some animal life and that, when there is rain, the desert is covered with green plants and flowers for a few weeks. At such times herds of animals might wander in from the plains, and the Indian hunters would follow them.

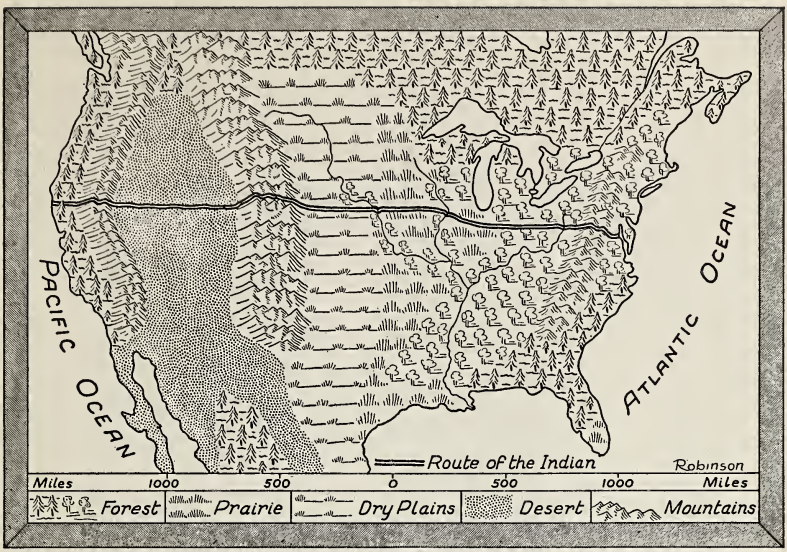
Our Indian would also learn that the desert is not a good place for the hunter who does not know its ways. Food there is scarce, and water is scarcer. The days are hot, and the nights are cold. Here in the desert, just as in the dry plains country, our hunter would have to learn new ways of living because the surroundings were so different from those back home. If he were brave



Many things in this picture of desert Indians show how these people made a living. There is a pile of corn husks, a jar for seed corn, a water jar, a woman weaving, a man digging, a woman planting, and a man resting. There is a river in the distance, for even desert people must have water to drink and for the corn and peppers they grow.

enough to try to make the desert his home, he would have to learn to use the plants and animals of the desert.

If our Indian pushed on, still farther west across more mountains, he would come to the Pacific Ocean. Along the coast he would find a region of forests, something like the forests he had lived in along the Atlantic Coast, although the kinds of trees would be strange to him. He would feel more at home here than he had in the prairies, the plains, the mountains, and the deserts. But even in this forest land he would not find things quite the same as at home. He would see giant trees, bigger than any he had ever seen before. And in the spring the rolling hills would be covered with wild flowers.



This map shows the route of the Indian traveler. You might make maps something like it to show similar trips, one northward and the other to the south, like the trips that are briefly described on the next few pages. Some members of the class could provide pictures from newspapers and magazines to show what the places visited would be like and how the people there live.

The Colder Northland

SUPPOSE we go back to the eastern forest near the Atlantic Ocean and follow another hunter who journeys northward instead of westward. For many days he would travel through a familiar kind of forest. But gradually the forests would change. There would be fewer oaks and beech trees, fewer hickories and maples. He would see more pines and spruces and firs, with here and there the white trunks of birch trees from whose bark he could make a tent or a boat.

He would see moose and elk, northern birds such as the loon, and strange fur-bearing animals like the wolverine, all new to him. Kinds of fish he had never

When Indians lived in forests like the one shown here, they had to make their living from the trees and other plants and from the animals that lived there. The Indians had no way to send to other parts of the world for things they did not have at home.

seen before would be in the cold streams. If he stayed, he would have to learn new tricks of hunting and new ways of living during the long cold winters and the short cool summers.

Still farther north, beyond the forests, he would find a region where the ground was wet and spongy with moss. The trees would be smaller and fewer in number. Much farther north there would be no trees, only the mossy land, frozen almost the whole year round. Only for a few short weeks in the summer would the snow melt and the surface of the ground thaw out. At this season pools of water would be standing everywhere. This is the treeless land of the Eskimos, who still live

These two pictures show what the traveler would have seen on his trip northward. In the picture above the land is rough and swampy. The trees are short and straggly. In the picture below is an Eskimo family. They must live on the animals they find.

by hunting and fishing along the cold arctic seas. Walrus, fish, seals, and birds which nest in the far north supply their wants.

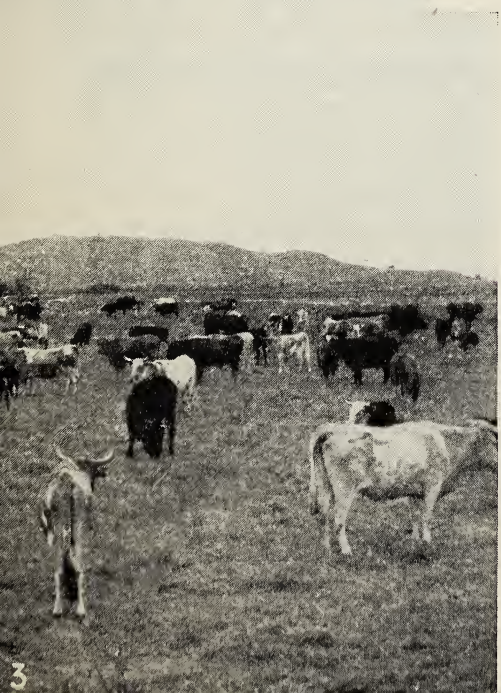
In the cold arctic land our hunter would find living quite different from the life he had led in his own forest. Because there was almost no wood, he would have to learn to burn the fat of seals and walrus. He could watch the Eskimo hunters make their houses of rocks and earth, skins, or sometimes of blocks of snow. He would notice that their bows were made of whalebone or of willow wood covered with sinews. Their boats were made of skins, and they used them to paddle after walrus and herds of seals. He might watch the Eskimo women sew clothes out of heavy skins and furs so that their men could keep warm in winter when they hunted or fished through holes in the ice. As for his food, if he stayed, he would have to learn to do without all vegetables—without almost everything except meat and fish.

South to Warmer Lands

SUPPOSE we go back once more to the forest land along the Atlantic Ocean and follow still another hunter in a journey southward. This hunter would reach warmer lands, where the summers are longer and the winters shorter than in the place where his own people live. The changes he would notice would not be sudden ones, but almost every day he would see kinds of plants, such as the sweet potato or the flowering jasmine, that were new to him.

There are places, closer to the equator, that are hotter than those already talked about. Some very hot and dry places are deserts of the worst kind. Other places are hot and wet, covered with heavy forests of

All these pictures were taken in South America. 1: A jungle on the bank of river. 2: A farm in a valley. 3: Cattle country. 4: A mountain of ice.



many kinds of trees and thick ropey vines. Bright colored parrots and other birds, monkeys, huge snakes, catlike animals, and swarms of insects are found in such places.

Still farther south, past the equator, the weather is not so hot. There is a belt of land or a region where the weather is temperate (neither very hot nor very cold), with winters and summers like ours. South of this temperate region there is a colder region, and finally, still farther south, there is a very cold region called the Antarctic.

What the Hunters' Trips Showed

We cannot have hunters travel all over the earth, for that would make too long a story. The thing to remember about the hunters' trips is that they found places with different climates, different plants, and different animals. There were places that were dry and places that were wet. In some regions were forests; in others were prairies, plains, or deserts. Because the climate, animals, and plants were different in different places, people had to live differently.

Compare the map of North America on page 45 with North America on the rainfall map on page 28. The amount of rain that falls in a place has a great deal to do with the plants that grow there. Look at the forest land along the Atlantic Ocean on both maps. Notice that this forest region receives more rain than the prairie region farther west. Now look again at the rainfall map on page 28 and find a region, close to the Pacific Ocean, where much rain falls. Find the same region on the map on page 45 and see if this is not a forest region, too.

Maps like the one on the next page and the one on page 46 are called *vegetation* maps. They show the kinds

This vegetation map shows you what you are most likely to find growing in different regions of North America. Of course, men have changed some parts of the country. They have irrigated some of the desert land, and they have cut down many of the forests.

of plants, or vegetation, that grow in different parts of the world. Notice another thing about the map on this page. There is a scale of miles below the map. The map on page 30 had a scale, also. You can copy such a scale on a piece of paper and measure distances on the map. Usually each map has its own scale. The one on page 58 has the same scale as the map on this page. When you

This vegetation map of the world shows forests, prairies, dry plains, and deserts in almost every continent. There are two kinds of forest regions, one with mostly pine trees, the other with hardwood trees like the birch and oak.

examine the map on page 46 you will see that other continents besides North America have regions with forests, prairies, dry plains, and deserts.

Different Ways of Living Long Ago

THOUSANDS of years ago all the people who lived on the different continents were hunters, fishermen, or pickers of wild things. These different peoples did not have the same customs or live in the same way. The forest hunter of olden times led a life that was different from the life of the prairie hunter and different from the life of the hunter on the dry plains. They had many different customs and ways of living in those ancient times, just as the American Indians had different customs and ways when the white men found them living in America. You have Probably read about the different tribes of American Indians and know that the desert Indians, such as the Zuñis, were not like the New England Indians. The Indians of Virginia were not like those of Washington and Oregon. Probably there were even greater differences between the hunting peoples who lived on other continents thousands of years ago.

Although these early peoples were not alike and had different customs and ways of living, many of them did have the same needs. Those who lived in a cold southern land needed plenty of fat, nourishing food like peoples in cold northern lands. They had to have warm clothing. And they needed good shelter from the cold weather.

People living in hot jungles also had about the same sort of needs. They needed shelter from the sun and rain. They needed protection from insects and dangerous animals. But they did not have to worry much

Picture 1 shows how desert Indians in North America used sun-dried bricks and mud to make their homes. Picture 3 shows how some African desert people used the same material.

Picture 2 shows how people living on islands in the Pacific Ocean used grass and leaves for their home. Picture 4 shows how an Indian in North America used the same kinds of material.

These people were not imitating others when they built their homes. It just happened that they discovered almost the same ways to use handy materials.

about clothing to keep them warm. We sometimes think food is plentiful and not hard to get in such places, but jungle peoples have to work to get enough to eat.

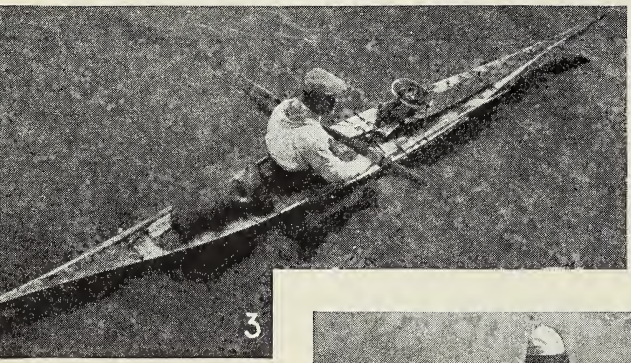
Sometimes different tribes of people who lived long ago discovered the same ways of supplying their needs. Some of the early hunters in Asia made their living by following herds of wild oxen. They had to have homes that could be carried along wherever they went. They found that tents were the best kind of homes for their use. The American Indians who followed herds of buffalo on the prairies also found that tents were the most useful kind of home.

Early hunters who lived by fishing supplied their needs in ways that were like the ways of other fishermen who lived perhaps thousands of miles away. One of their needs was to find easy ways to catch fish. They all learned to make hooks, spears, lines, or nets. They looked about them for materials they could use, and they found fish bones, shells, grass, bark, vines, and sticks. It doesn't surprise us much to learn that the fish hooks and nets and spears used by these early fishermen were very much alike all over the world.

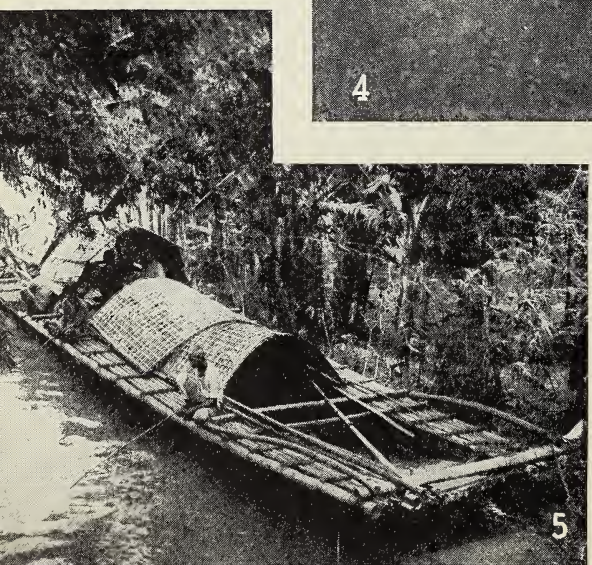
Why Some Ways Were Different

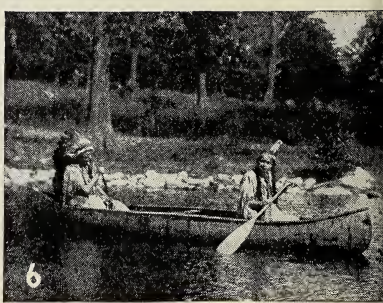
Some of these people did not always find the same ways to supply a need. Early fishermen the world over needed a way to travel on water. Boats were the answer to that problem, and many of these early fishermen found ways to make boats. But the boats of one people were not always like the boats of another people. The early Egyptian fisherman made his boat by tying together bundles of long river reeds. The

These two pages show boats made of different materials by people who live in different parts of the world. The boat in Picture 1 is woven of reeds like a basket. Boat 2 is a wooden dugout.



Boat 3 is an Eskimo boat of skins. Men in Picture 4 are on blown-up skins. Boat 5 is made of bamboo, and boat 6 is a bark canoe.

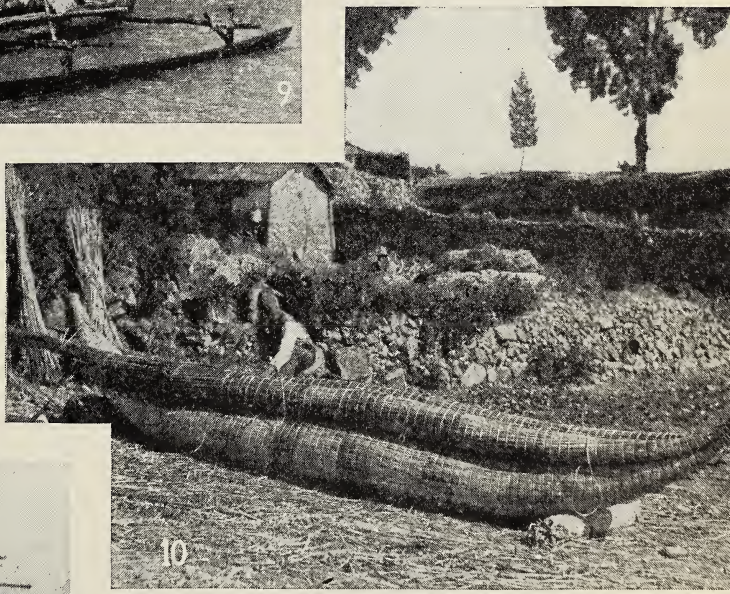




The boat-makers used materials found near home.

Boat 7 is an African boat of reeds, very much like the South-American boat in 10. Boat 8 is made of boards that are carefully cut and smoothed.

The boats in Pictures 9, 11, and 12 are made from logs. 9 is a South Sea Island Boat. 11 is an African boat. 12 is a boat made by a jungle Indian of South America.



Eskimo made his boat of hides. Some American Indians made theirs of bark, while other tribes hollowed out logs. Still other peoples made boats like baskets, weaving them of reeds or grass and smearing them with sticky material to keep out the water. And some peoples made rafts of animal skins sewn into tight bags and blown up with air.

These boats were different because these people had to use the materials they found in the place where they were living. The Egyptian did not have any good wood in his land. Boards cannot be cut from palm trees or from the wood of stunted thorny trees. But the Egyptian did find plenty of tall, strong reeds growing along the Nile, and he used these for his boats. The North American Indian found forests of trees along the shores of rivers, lakes, and the ocean. He learned how to use the wood or the bark of trees to make his boats.

The Indians, the Egyptians, and other peoples used what was near their homes for houses, clothing, and food. They made use of the resources they found close by. The South Sea islander ate fish and coconuts and fruit, made cloth from bark, and built his house of grass and leaves because he could find those things on his island. Peoples in other parts of the world found different materials from which to make their homes and clothing and other foods they could eat. What people ate and wore and what kinds of homes they lived in depended on the materials they could find in the place where they lived.

Finding Easier Ways of Living

You have read how the early hunters improved old tools and invented new ones, such as the bow and arrow, the sling, and other weapons. These new

tools helped them to make a living. With good weapons the hunters were able to kill more animals with less work and less danger. And men learned better ways to protect their families.

Hunting has always been a hard way to make a living, and it was especially hard long ago. Hunters often had to walk many miles or wait many hours in order to get a supply of food. They had to be strong and quick and patient.

A hunter needed plenty of land on which to hunt animals. Today we have some idea of how much land a hunter has to have in order to get food for his family. In Canada some Indians live on reservations where they hunt for a living, just as their ancestors did before the white men came. The Canadian government has found that one Indian family must have about fifteen square miles of good hunting ground in order to get enough food. If a family had less land, the game and fish would be killed off faster than animals would be born, and the family might starve.

Indians who lived in other parts of North America probably needed just as much land for hunting as these Canadian Indians. The state of Ohio is big enough to give fifteen square miles to each of ten thousand families. There were about that many Indian families hunting in Ohio when the white men came. Probably in ancient times, in many parts of the world, hunters needed that much or even more land for each family.

Hunting was all right as a way to make a living as long as there were only a few people and plenty of animals. But there were often times when wild animals were not plentiful. And there were times when too many people in one region tried to make a living

Suppose that the hunter who lives in the cave with his family needs all the land you can see in this picture. When game is plentiful, he might be able to do his hunting near the cave. But when game is scarce, he might have to walk miles up and down the hills you see in the distance in order to get enough to eat.

by hunting. A hunter could never be certain of bringing home food. As years passed, there were more and more people in the world. Then the hunting became poorer, and people had to find other ways to make a living. Of course people would like to find easier, surer ways of supplying themselves with enough food. Later chapters will tell some of the easier, surer ways they found.

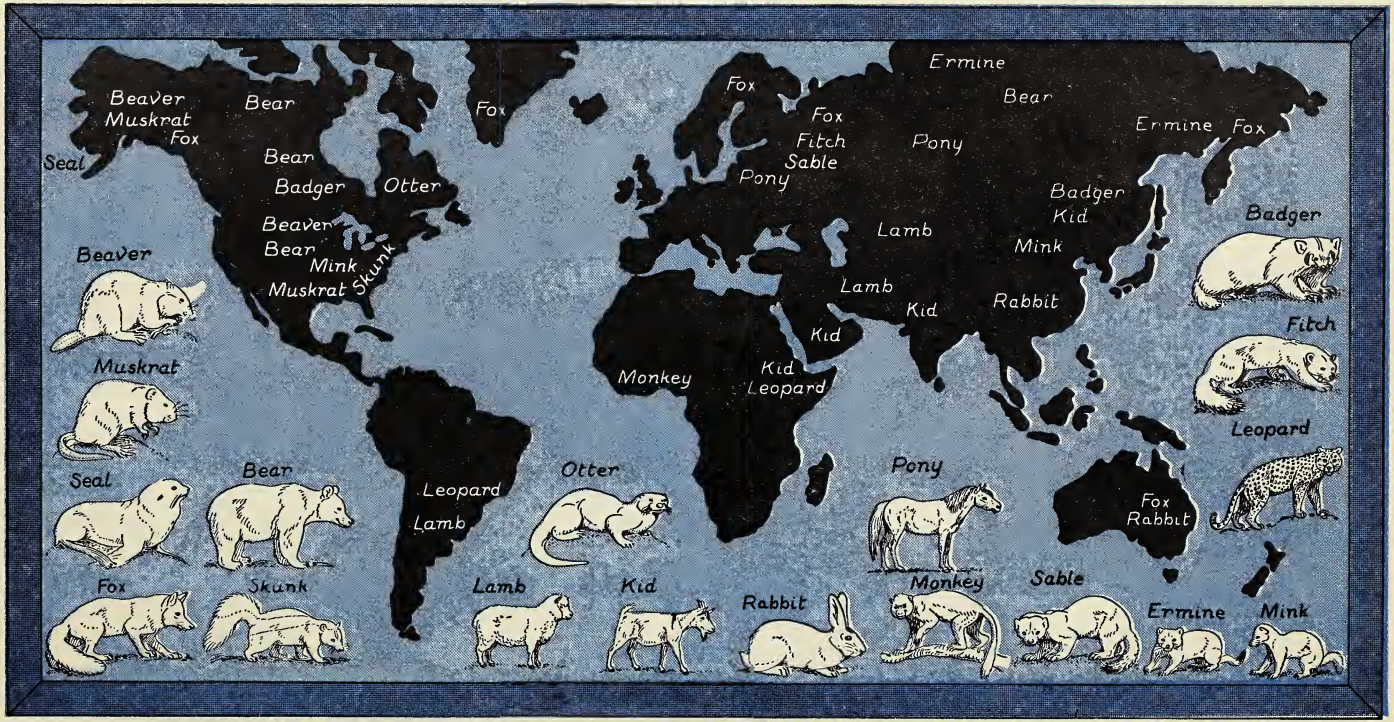
Hunting and Fishing Today

THE WORLD of today is very different from the world of long ago. There are many ways of making a living besides hunting, fishing, and gathering wild things. Of course, many of us know people who still go hunting, but most of them do it because they think it is good sport. They do not have to go hunting just to get food for their families. People now have other ways of getting food.

But there are parts of the world where men still hunt for a living. Many jungle dwellers get their daily food by hunting or fishing. Others catch snakes and other animals for their skins, which they trade for food. In cooler parts of the world fur-trappers make their living by catching fur-bearing animals, such as beavers, skunks, muskrats, and minks.

Men still hunt for plants that are useful in making medicines. They still gather mushrooms in the fields and nuts from wild trees. Some people make a part of their living by gathering wild berries.

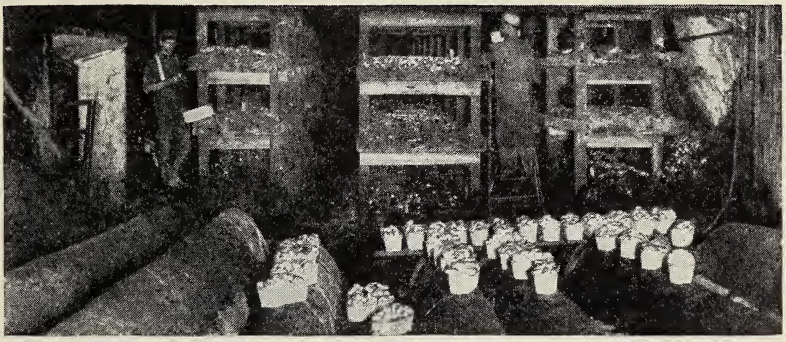
More and more, though, these things that men once had to get by hunting are being grown on farms. As you know, most meat is now produced on farms or ranches. The next chapter will have more to say about that. Even fur-bearing animals are being raised on



This map of the world shows where hunters and trappers get most of the furs that are used today.

farms. Rubber used to come just from wild trees, but now most of it comes from trees on plantations that were started and cared for by men. Most of the nuts we buy come from orchards where the trees are carefully planted and tended. Even mushrooms are raised in buildings so that people do not have to depend on wild mushrooms.

Although men have found ways to grow most of these things on farms, they still have to catch most of their fish in rivers, lakes, and oceans. In some places many people make a living by catching fish to sell.



The lower picture shows mushrooms growing wild in a field. Some of the mushrooms bought in stores grew wild. But most of them were grown in trays of dirt kept in cellars or in buildings without windows. Mushrooms grow better in the dark than in the light.

This map shows the fishing grounds around North America. The places with the darkest shading furnish the most fish.

On many islands, such as the South Sea Islands, people catch fish for their own food.

In this country, catching fish is a business for many fishermen. Instead of providing food for just the fishermen's families, the fish are shipped to all parts of the country. Along the seacoast and on the Great Lakes, fishermen use modern boats and great nets. They pack the fish in ice and ship them long distances to market.

In different parts of the world fish are canned or preserved in some way. Salmon, caught in the rivers of Alaska, British Columbia, Washington, and Oregon, are canned in canneries close to the fishing grounds. Tuna fish, caught along the Pacific coast, and sardines that are caught in many parts of the world are also canned. Codfish and other kinds caught in the North Atlantic are often dried and salted. Some fish, such as herring, are pickled in salty liquids. Still other kinds of fish are smoked, somewhat the way hams and bacon are smoked to preserve them.

Very few of the fish we eat are raised on farms. But many of our states, and the national government, too, have gone into a kind of fish-farming business. Their

Pictures of fishing, like the one above, are often found in magazines and newspapers. Members of your class might form a committee to look for such pictures to show the class. Another committee might write to the State Fish and Game Warden for booklets and other information about hunting and fishing in your state. Still another committee might find and read a good story about fishermen.

Make a list of the kinds of fish sold in your community. See if you can discover where these fish were caught.

fish-farms do not raise fish to sell as food. Instead, young fish by the millions are raised in tanks and pools and then let loose in rivers and lakes to grow.

These young fish are raised and put into streams and lakes where the fishing is poor and the young fish will have a chance to grow. There are many reasons why some of our fishing places are not so good as they used to be. In some places the water has been poisoned by sewage from cities. In others the feeding grounds have been ruined by mud that has been washed off farms by the rain and carried away by streams. In many places fishermen have caught too many fish. The grown fish that are left do not produce enough eggs. Not enough small fish are hatched to grow up and replace the fish that are caught.

One of the reasons that fishermen catch too many fish is that they have improved their ways of fishing. Many use modern boats, run by gasoline or steam so they can spend more time fishing and less time traveling back and forth to the fishing grounds. They use bigger nets than ever before and bring in more fish. They have invented other kinds of equipment and new ways to help in catching more fish.

Getting More Things

MEN HAVE always looked for ways to get more of the things they want. As people wanted more things, they found ways to get more. When they found a use for some of the resources of the world, such as fish or other animals, they improved old tools and invented new ones. With the improved tools and the new tools they could take and use more and more of the resources. We still have the hatchet, the spear and the net, but hunters of today have many more weapons

they can use. Of course, there is always the danger that men will use up too many of the resources and leave nothing for the future.

Your Region and Its Resources

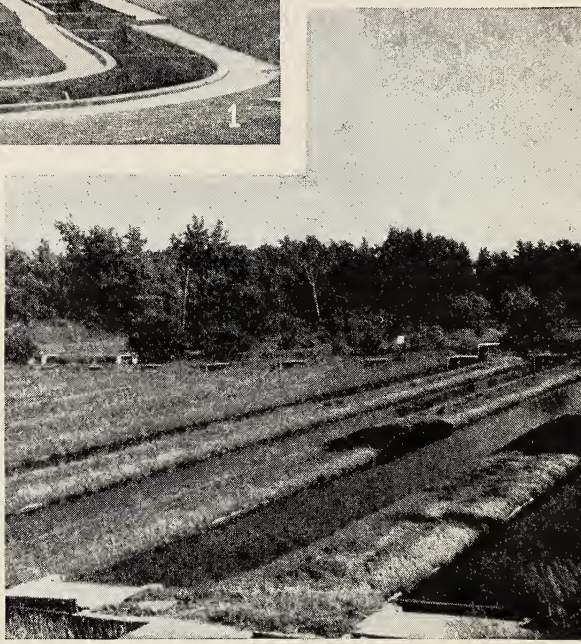
A CONVENIENT way to study the resources of our country is to divide the country into regions. You can study the resources of your own region first, and then the resources of regions nearest you, and lastly the resources of the regions farthest away. If you were to go back over the journey the Indian traveler took, you would find that the United States could be divided into eight different regions. Each region is made up of several states. And these states have resources which make that particular region different from the other seven regions.

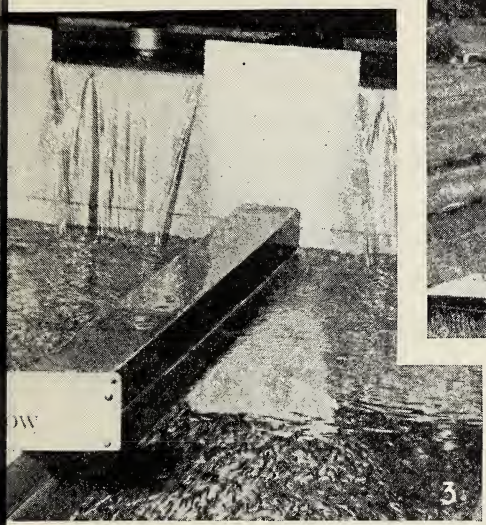
The map on page 64 shows how the United States is divided into eight regions. You are going to need such a map many times in your study of this book, and it would be a good thing to make a large one that the whole class could use. Perhaps you can find a large map to trace. Follow the state boundary lines when you divide your map into regions just like the regions shown in the map on page 64.

You will also want an even larger map of the region where you live. You can mark that map with little pictures like the ones shown at the bottom of the map on page 39. But don't cover the map with these little pictures (called symbols). Leave room to put in the rivers, the mountains, and the important cities. If there are large bodies of water you will want to label them and perhaps color them blue.

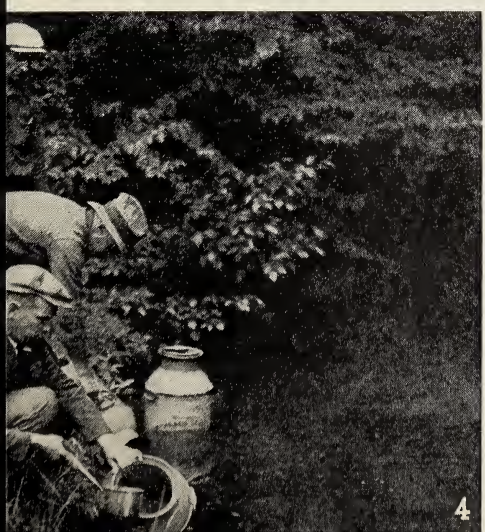
When the map of your region is completed, the class can study the resources of your region. One way to do it is to divide the class into committees. One committee can

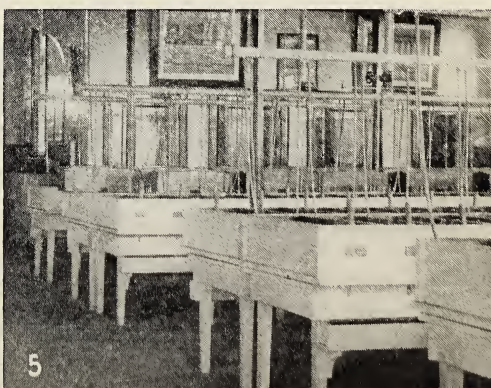
The pictures on this page were taken at the kind of fish farm that is called a fish hatchery.

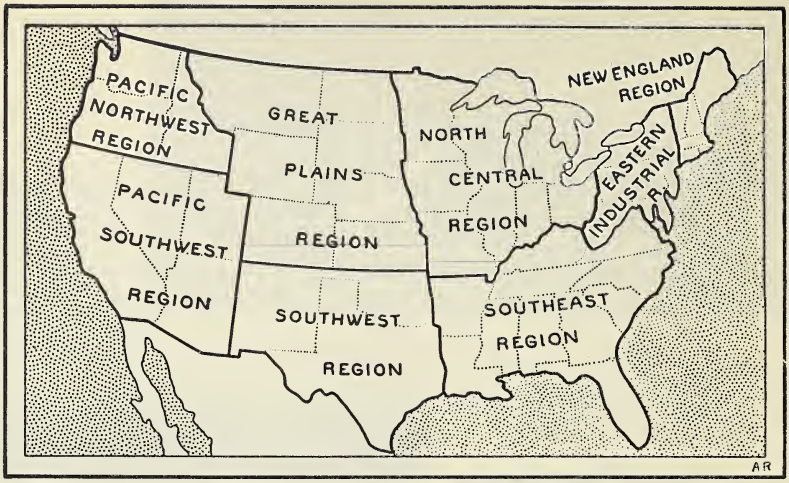




Picture 1: The hatchery building and the stream between concrete banks. Picture 2: Some of the outdoor pools where the grown fish feed. Picture 3: A tank inside the building with thousands of tiny trout. Picture 5: The tanks where the fish eggs are hatched. Picture 4: Men carefully dipping baby fish out of cans into a stream.







find out about the soil, another about the climate, another about the plants, and still another about the animals of your region. Each committee could consult books in the library, magazines, and newspapers, and prepare a report. If each committee has three or four members on it, each can do a part of the work.

When the time comes to make a report to the whole class, each member of the committee could have a part in it. One might point out on the map the mountains, rivers, and valleys of your region. A pupil on another committee might tell about the rainfall and temperature. A pupil on still another committee might tell about the crops grown.

These reports help you to understand what the resources of a region are. They help you to understand your surroundings, which people call your "environment," — a large word that means the things that are around you.

Another way to study the resources of a region would be to study the Indians who once lived there. The Indian traveler found the Indians making use of the resources to meet their own needs. And because the resources were

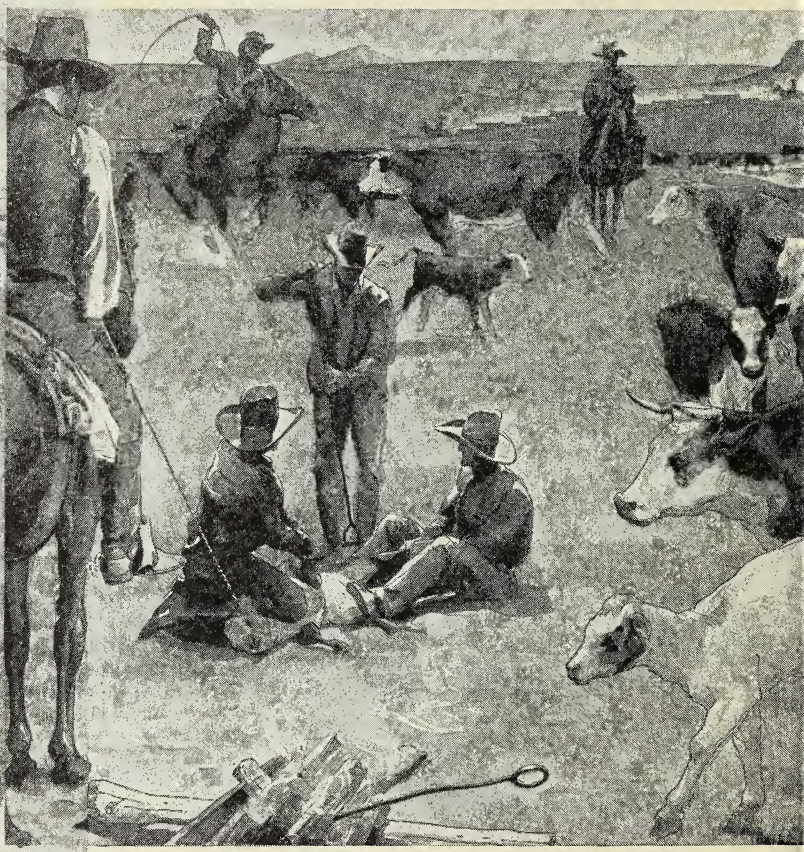
different, the Indians lived differently. The class might be divided into eight committees, one for each region. Each committee might study the Indians of that region and find out how they built their houses, what materials they used for clothing, what they ate, how the tribe was run — everything possible about how the Indians lived.

The reports of the committees might be made in the form of an exhibit. An Indian village could be constructed to show how the houses were built. Part of the report could be in the form of drawings that could be hung on the wall or made into illustrations for a written report. Perhaps a collection of Indian clothing, tools, or weapons could be made.

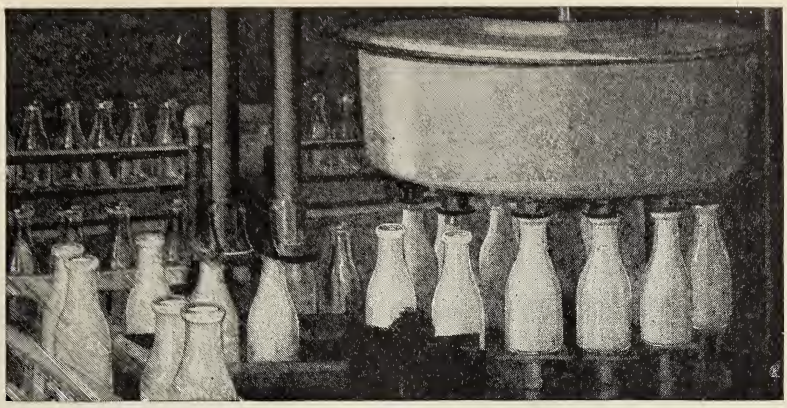
As you study *This Useful World* you may come across new words. You should want to learn them so that you can use the words correctly and understand them when others use them. Make a place in your notebook for these new words. Call it a "Glossary," which means a list of special words and their meanings. When you come across a word that is new to you, look it up and add it to your glossary. You might start the glossary with these words and some easy definitions which you can find in the dictionary:

resources	globe	continent	weather
frigid	temperate	torrid	zone
temperature	climate	equator	vegetation
weapons	boomerang	thermometer	

CHAPTER THREE



THE HERDER



The milk we drink comes from dairy cows, not from beef cattle like those you see in the picture on the opposite page.

The Idea of Taming Animals

Long ago, so very long ago that we do not know just when or where, some hunters began to find new ways to make a living. Hunting was not easy work, and sometimes the hunters did not get enough to eat. During some seasons, of course, the hunting was good, because animals were plentiful. But there were times when the hunting wasn't good, because animals were few and hard to find. In such times many tired, hungry hunters must often have wished that they could find a lot of animals gathered together.

Some smart hunter, or some lazy one, might have thought that it would be a good idea to have some animals tied up near home or kept in a pen. Then, when his family needed meat, or a skin for some clothes, or a bone for a tool, he could kill one of those tied-up animals. The hunter would know just where the animal was; he wouldn't have to hunt it over a lot of ground in all kinds of weather. Killing the animal would be easy, and a lot of time and work would be saved.

The trouble with such an idea was that someone would first have to catch the animal and then tie it up or put it in a pen. That would be as much work and as dangerous as hunting. And tying up the animals wouldn't make them tame. But we can see that it would be a good thing for a hunter to be able to kill animals whenever he wanted. Then he would get meat or skins when these things were needed, instead of having too much in some seasons and not enough in others.

We do not know for certain when the first animals were tamed, nor just what kind of animals they were, but we do know that men succeeded in taming some animals. We cannot be sure just where in the world men tamed the first animals, nor just how they managed to do it, but we do know that it happened a long time ago.

How Animals Were Tamed

People discovered that some animals became tame when they lived near people. Although we cannot know for certain, we can imagine several ways that animals might have been tamed. Farmer boys today sometimes find baby animals—deer, rabbits, squirrels, crows, and even coyotes and foxes—which they take home, feed, and care for. Some kinds of animals grow up tame and gentle. Others, like the coyote and fox, almost never learn to trust people and cannot be trusted. But we are fairly sure that the wild ancestors of our cow, horse, and sheep were first tamed this way. Young animals were caught by people and were cared for until they became tame.

There is another way in which animals might have been tamed. There are many kinds of animals that

There are wild animals, like the skunk in this picture, that are not afraid of people. Such animals can usually be tamed. Of course, there's a good reason why people don't often tame skunks.

like to be where there are people, because they can usually find waste food. Some of these animals we do not like to have around us, as, for instance, the rat, mouse, sparrow, cockroach, and housefly. But some of the other animals, such as pigs, dogs, and chickens, are useful.

Long ago certain kinds of animals probably hung around the camps of hunters, stealing scraps of food and eating waste. Boys and girls that have gone camping know that some animals are not afraid to come into camp to get food. Skunks and porcupines often walk right into camps while people are around. Long ago there were probably several kinds of animals that would do that. The piles of bones and meat scraps

near the home of a hunter were fine places for a hungry animal to get food.

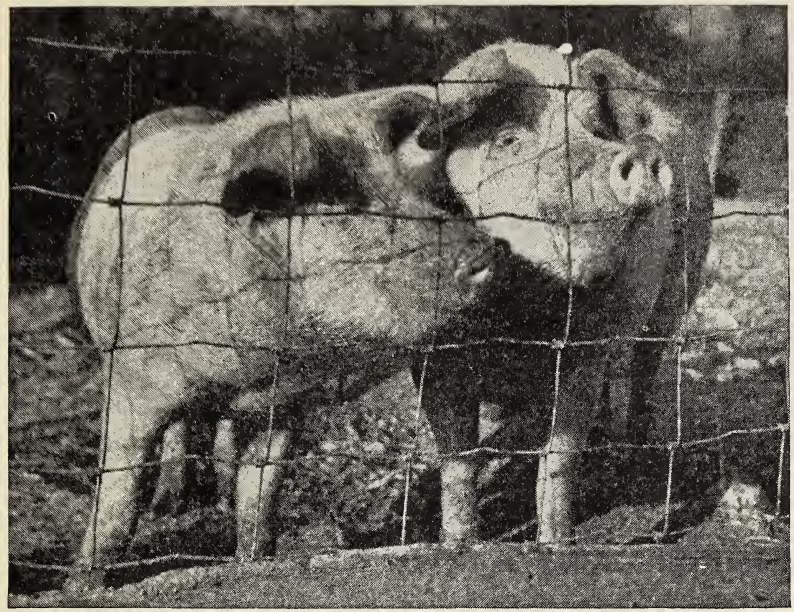
Perhaps the first animals that came sneaking to the garbage heaps to get food were afraid of people and never lost their fear. But the young of these animals grew up more used to people and their young were even less afraid. Perhaps little children who usually haven't much fear of wild animals offered the animals food, just as people today offer peanuts to squirrels.

There is another way in which some animals might have been tamed. In some regions the hunters followed herds of animals in order to kill them, just as some Indians in North America followed herds of buffalo. Perhaps certain kinds of early animals became used to seeing men and gradually lost their fear of them. Instead of running away the moment they saw or smelled men, they might have gone on grazing. The American buffaloes were not very much afraid of people. Other animals, a long time ago, might have acted the same way. Little by little such animals would become tame.

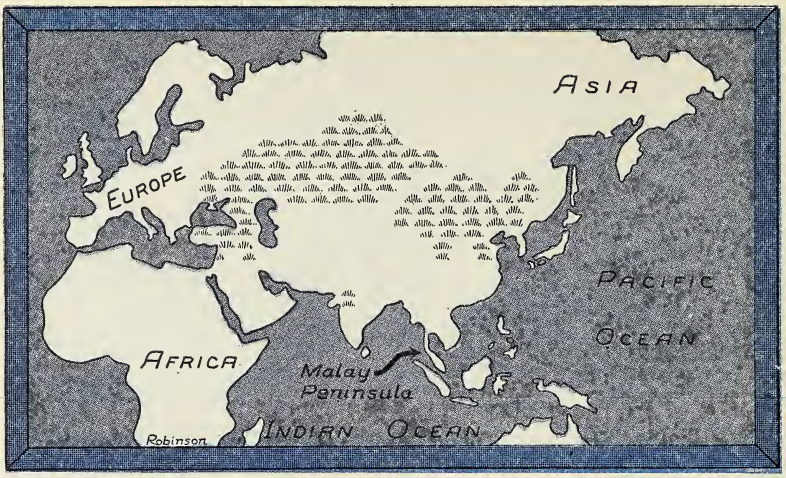
The Kind of Animals Tamed

In whatever way the first wild animals were tamed, it happened so long ago that we cannot be sure just what the first tame animals looked like. Our dairy cows are probably descendants of two or three kinds of wild oxen, but they look very different from any of the wild kinds. The pig of today is supposed to have come from the wild hogs that once lived in the forests of Europe. The dog is probably a mixture of several kinds of wild dogs.

The animals we call tame, or domesticated, were not all tamed at the same time or by the same peoples.



Pigs, which are also called hogs or swine, are generally friendly and inquisitive. They are not much like the fierce wild hog you see in the lower picture. This wild hog was captured in a forest in Europe and is supposed to be very like the ancestors of our pigs.



The tufts of grass on this map show the great grassy plains of Europe and Asia. These plains were once the feeding grounds of many herds of wild animals. The arrow on the map points to the Malay Peninsula where the first chickens probably lived.

Turkeys, for example, have been tamed and raised by people for only a few hundred years, and so they are not very different from wild turkeys. People in Europe had never seen turkeys, either tame or wild, until some of them were brought back from America. The white men found that some of the Indian tribes had tame turkeys. Other Indian tribes did not bother to keep tame turkeys because the wild ones were so plentiful that they could always have turkeys to eat.

The first chickens were probably tamed in the jungles of the Malay Peninsula, in the southeastern corner of Asia. But chickens gradually changed and today are not much like the wild chickens that still live in the Malay Peninsula.

Look at the map on this page and find the great plains or grasslands of Europe and Asia. You will see that these grasslands stretch for hundreds of miles across Europe and Asia. These plains are called *steppes*, not

because they are like steps, for they are not, but simply because that is the Russian word for a grassy plain with almost no trees.

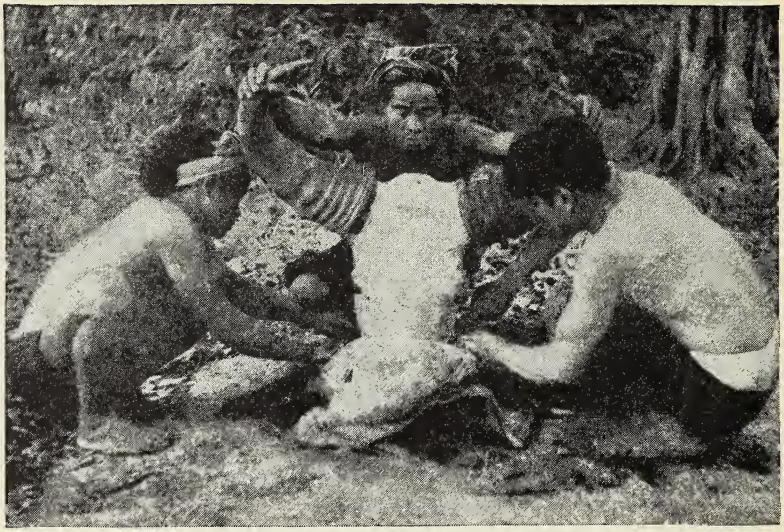
Across these great grassy plains herds of wild oxen, horses, goats, asses, and sheep once roamed, hunting for food and water. The hunters followed them, often moving their families and few belongings with them. Perhaps one group of hunters tamed some sheep or goats, and another group tamed some oxen or horses. In some way people did learn to tame some animals and keep them in herds.

The Idea of Owning Things

A very important thing happened when people began to have tame animals. Men also began to think that certain things belonged to certain people. They began to have ideas about owning things. To understand this, perhaps we had better go back to an earlier time, when men began to make the first tools.

As you have read, the first tools were just sticks and stones and pieces of bone. Probably men used them when tools were needed and then threw them away. But sooner or later, someone must have remembered that he had used a particularly fine stick the day before and tried to find it so that he could use it again. Or a man who had spent several hours looking for a sharp stone thought that he could save time and trouble by keeping it instead of throwing it away. Perhaps you have felt that way about some things you have used.

Men found that they used certain stones or sticks over and over again, and they also found that they could save time by keeping these crude tools where they could be easily found. At first, perhaps, all the families in a group kept their weapons and other things



These native hunters have killed a wild ox and are sharing the meat. The man who actually killed the ox doesn't think that the meat should belong to him. He doesn't think that he owned the ox.

together. Then men got to thinking that their own particular pointed sticks and sharp stones were better than the ones their neighbors used, for people are like that. And so men got the idea of having things of their own—of owning things.

Many years must have passed before men began to have ideas about owning other things besides weapons and ornaments. If a group of hunters lived together, each hunter thought of his weapons as his own, but no one could say that certain animals belonged to him. Even when a hunter killed an animal, he did not think of the animal as his. The whole group shared in the food. This is true today in different parts of the world among many savage peoples who still hunt for a living. The whole tribe shares in the food that the hunters bring in.

Perhaps men next got the idea that they owned the places where they lived. If a hunter lived in a

cave, he might think of the cave as his own and keep other hunters from living there. But when he decided to move, he just left and probably didn't care if some other family moved in. He didn't think about renting or selling his cave.

Men did not like to have strange hunters coming to their hunting ground and killing the animals. There might not be enough animals for all, and so they tried to keep others out of their hunting ground. In this way groups of hunters began to think about the land as belonging to them, that is, to the whole group but not to any one person. An American Indian, for example, would not have thought he owned the land where he had his tepee, but he might have said that the land belonged to his tribe. You may know boys who play ball or some other game in a particular place. Not one of them would say he owned the land, but perhaps all of them do think they have some special right to play there.

Some of these hunting peoples never did get the idea that a man could own land by himself alone. You have probably read how the white men bought land from the American Indians by giving them a few cents' worth of beads or some cheap tools. But often the Indians didn't know they were selling the land. They thought land was for everyone who lived there to use. Perhaps the Indians thought the white men were just giving them presents because they were glad the Indians would let them stay on the land and use it the way the Indians did.

Hunters of long ago probably had the same ideas about owning things that the North American Indians did. But when men began taming animals, they got still more ideas about owning things. The man who

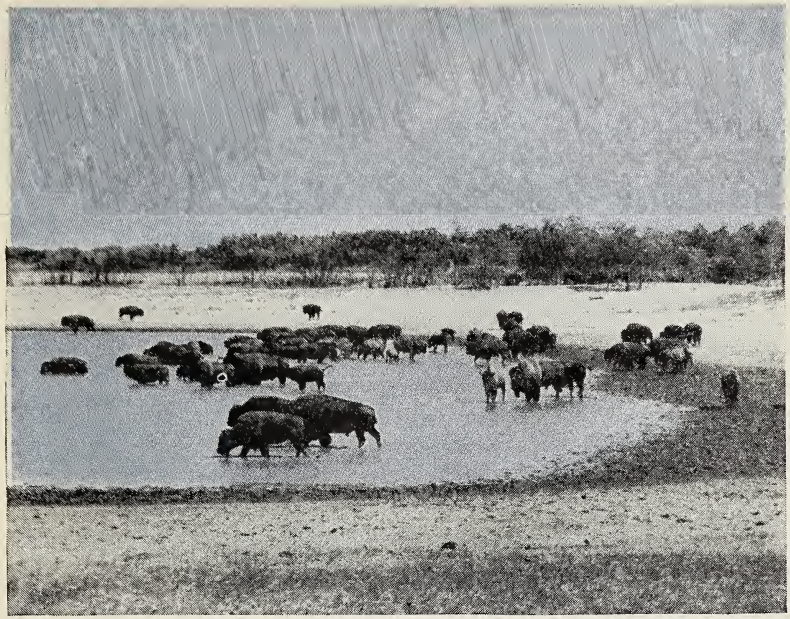
had a herd of sheep knew very well that he had lost something valuable if a wolf killed one of his lambs. And he would fight anyone in another family or group who tried to take one of the sheep. The sheep were his; they were his property. He took care of them, drove them to good feeding grounds, and protected them from wild beasts. Cattle owners felt the same way about their animals. Animals were worth something to their owners—they were what we call property.

Herding Animals—A New Way of Living

We have a name for men who own and take care of herds of animals; we call them herders or herdsmen. The first men to be herdsmen probably lived the way hunters did. But little by little they found that herding meant living in a different way. The herdsman could not live the same way the hunter did.

Keeping a herd was work that was different from the work of a hunter. The herdsman had to drive his animals from one feeding ground to another. He had to keep his animals from straying. He had to protect his animals from the attacks of wild beasts. Perhaps he had tame dogs to help him take care of his animals and protect them.

The women in the families of herdsmen had work to do that was different from the work of hunters' wives and daughters. They learned to milk such animals as goats, cows, sheep, camels, mares, and even water buffaloes. This milk gave people a new kind of nourishing food. They experimented and found ways to use milk besides drinking it. A very long time ago, people in many parts of the world discovered how to make butter and cheese.



The herd of buffaloes shown in this picture is protected by the government. Have a committee in your class read about buffaloes in encyclopedias and other books and then report to the class.

The clothing of herding people changed, too. They discovered that they did not need to kill their animals when they needed clothing. Instead of killing animals and using their skins, they found ways to clip the wool from sheep and the hair from goats and other animals and to use this material for making cloth. Of course, they kept on using the skins of animals, too, but they now had another material, cloth, out of which to make clothes.

Perhaps one of the greatest changes in ways of living was in homes. The hunter who lived in a cave or a hut made of branches probably did not move very often. He would stay in one place as long as there were animals for him to hunt and kill. When there were no more, he looked for another hunting ground and found or made himself another place to live.

1

2

The pictures on this page and the next show the homes of nomads who live in the world today. Picture 1 shows the hut of a Persian nomad. It is made of woven matting. Picture 2 shows the tent of a Lapp reindeer herder. Picture 3 is a woolen tent used by African sheep herders. Picture 4 shows the framework of a tent used by some nomads in Asia, while Picture 5 shows the frame covered with felt. Picture 6 shows the tent of other nomads in Asia.

4

5

6

The herdsman could not do this. He had to keep his flock or herd together and not let them straggle all over the feeding grounds and perhaps be lost or killed by wild animals. With many animals together instead of just a few, the grass was soon eaten in one place, and the herd had to move on. When the herd moved far, the herdsman moved with it. The simplest way to live was for the herdsman's family to move, too, and so most herding people came to lead wandering lives. We call them nomads.

If you have ever gone on a camping trip, you know the kind of home the nomad had. The nomad wanted a dwelling he could easily move, and so he used a tent. Skins were the handiest material to use, because every herdsman had a supply of them. Many nomads used tents of skins, stretched over small poles. Some of these tents were much like the tepees of the North American Indians who lived on the plains and followed the wild bison instead of having their own tame herds.

In some parts of the world herdsmen found other ways to make tents. Perhaps they objected to tents made of skins, because skins are heavy and the tents were troublesome to move. Besides, when skins get wet, they soak up a lot of water and become even heavier. When they dry out, the skins are very stiff and hard to handle. Herding people who knew how to clip wool, make yarn, and weave cloth, made tents of cloth which were lighter and easier to handle than tents made of skins.

Although herdsmen led lives that were quite different from the lives of hunters, they did some of the same things hunters did. They ate wild fruits and plants that they knew were good, and they did some hunting, too. If a herdsman could kill a wild animal

A group in the class might collect pictures of animals at work, like this picture of an elephant hauling a big block of stone along a road in India. Another group could make a map of the world and mark on it the places where the pictures were taken.

that was good to eat, that saved killing one of his own valuable animals.

Making Animals Work for Man

A long time ago men discovered that they could train animals to do work for them. Dogs could be trained to hunt for their masters instead of for themselves. Early herdsmen found that dogs could also be trained to take care of sheep and cattle. Horses were useful to ride, especially for a man who had to tend large herds of cattle. Horses, oxen, and asses could be trained to carry or pull loads and be useful when the family moved. And so men found ways to

use certain animals for work, to do tasks that needed more strength, or greater speed, or keener scent than men had. This was a very important discovery for men to make.

Without animals to help them move, herdsmen would have had a difficult time. They would have had to carry all their belongings whenever the herd moved to another pasture ground. But with trained animals to carry or pull loads, the herdsman and his family could have bigger tents and more belongings. Even with the animals to help them, nomads had to live very simply. They could not easily move a lot of possessions, and so they got along with as few things as possible. Living in tents meant living very simply. Anyone who has gone camping in a tent knows that.

Although nomads lived simply, they could have things of beauty. Some of them made beautiful rugs, scarfs, and other fabrics dyed with colors made from plants. Some carved or stamped leather with designs they made up or copied from things they saw around them. Perhaps you have seen the kind of rug called oriental, or have admired a silver-mounted Mexican saddle. Long ago the nomad tribesmen in some regions learned to make such things. They also learned to tell stories to amuse themselves around the camp fires, and to play on musical instruments which they invented.

Nomad Families Could Stay Together

In still another way, herding meant living a life that was different from the life of hunting peoples. Probably most hunting families lived in scattered small groups or alone. Here and there a few families might live together for protection. But the hunting itself was usually a job for just one man. Some fishermen and

One of the Arabs in Picture 1 is a skillful weaver of beautiful rugs. The nomad women in Picture 2 live in Asia. The Egyptian woman in Picture 3 keeps goats for a living, but has time to make baskets. The Africans in Picture 4 herd cattle, but also do wood carving.

Perhaps you can find pictures of other examples of people who make beautiful, artistic things.

some hunters of big animals banded together, but most hunters had to work alone. When a young man grew up, he might have to move away from the hunting ground where his father and mother and sisters and brothers lived. Perhaps that hunting ground would supply only enough food for one family or just the few families in a tiny settlement.

When men owned herds of animals, families could stay together, even when the children grew up, married, and had families of their own. Taking care of a large herd was a job for more than one man, some-

These men are making butter in the kind of churn used in some parts of India. Such churns have been used there for hundreds of years, as butter-making was discovered many centuries ago. An interesting thing to do is to find out about butter-making.

The cattle in this picture have been driven in from the rough, hilly grazing land in the hills you can see in the distance. This many cattle needed many square miles of such grazing land.

times for many men. And there was plenty of work for women, making yarn, weaving cloth, tanning animal skins, milking, churning butter, making cheese, cooking, and sewing.

As time went on, men learned more and more about the business of herding. They learned the ways of their animals, discovered what to do for sick or injured animals, and found many uses for products they could get from their animals. Thousands of people made their living with herds of animals. Whether there were herds of cattle, flocks of sheep or goats, droves of horses, or other animals, depended on the kind of land and the kind of feed the animals could get.

Some of these animals, goats for instance, could live on land that we would think pretty bare. If the animals could get a living on such land, the herdsmen could manage to live fairly well, for they depended on

the animals. Do you see why it is that herding is a way to make some kinds of land useful? When men found this way to make land useful, they had found a way to make the land support more people. More people could live in the world.

Herdsmen of Bible Times

MANY of the people you read about in the Old Testament were herdsmen. Of course, most of these Bible folk lived thousands of years after men had first learned to keep animals in herds, and by this time there were other ways of making a living besides hunting and herding. People had discovered farming and trading, but those ways of living will take chapters by themselves.

When you think about the people in the Bible as herdsmen and shepherds, the stories are easier to understand. If you will read the story of Abraham, you will learn that he was a wealthy sheepherder. He drove his flocks from one pasture ground to another, always stopping at places where water could be found.

The herdsman who did his work well, as Abraham did, had many fine animals—more than he could take care of himself. He was glad to have many children to help him. Sometimes he traded some of his animals for slaves to do part of the work. Or he would hire helpers, paying them with food and with animals. Abraham had over three hundred trained servants.

Herdsmen like Abraham thought of the pasture lands as their own and tried to keep other herdsmen away. To do this they needed help from their sons and their servants, because sometimes they had to fight strange herdsmen. Hunters could live together in small families, but herdsmen had to learn how to live, work,

This is the same scene that you saw in the picture on page 54, except that a herdsman now lives on the land. His herds will need only part of the land the hunter used. Places where the herds do not go are shaded to show you that the herdsman does not need as much land as a hunter in order to live.

and fight in larger groups. If they didn't, they might be driven out of their pasture lands by other herdsmen.

There are many stories of such fights in the Old Testament. There are stories of herdsmen who raided the flocks of other herdsmen, stealing as many animals as they could. Often the herdsmen who were robbed would fight back and there would be a battle. Relatives on both sides might join the fighting and there would be war.

Herdsmen had other enemies—hunger and thirst. Wells and streams of water gave out in dry seasons. There would be neither enough grass for the herds to eat nor water for them to drink. That would cause a time of starvation, which we call a famine. Perhaps you have read of such a time in the story of Joseph.

There was a famine in the land of the Hebrews when Joseph's brothers were sent to Egypt to buy grain. The Egyptians were not herdsmen, but farmers, and they had grain to sell.

Herdsmen did not always buy food when famines came. Sometimes they would gather in great armed bands and travel like an army toward lands where there were rains and moist fields, toward lands of farms and cities. They would go, not to buy, but to fight and to take what they wanted. Sometimes they would return home, after stealing what they needed; or sometimes they might be driven away empty-handed. In the peaceful farming communities the herdsmen from the plains and mountains were hated.

Sometimes the herdsmen stayed in the new land, where living was easier and famines did not come so often. Band after band of herdsmen left the great plains and steppes or the grassy slopes of mountains because of famine or because other herdsmen drove

Only a herdsman could make a prayer like this: "For He is our God; and we are the people of His pasture, and the sheep of His hand."

The herdsman in this picture lives in Palestine, and his flock must get their living from very rough, stony ground.

them away. They did not always settle in other grazing lands with their animals. Sometimes they stopped where there were farms and cities and learned new ways to make a living. These ways were different from tending flocks and herding cattle.

Ideas about God

YOU HAVE seen how many of our ideas about property, about working together, and about war have come from these herdsmen of long ago. The herdsman knew about the stars, too, because he had learned to read the sky as we read calendars. The sun was his clock by day, and the moon and stars told him the time at night. The night skies are very clear and the stars are bright in the dry climate of the grasslands and in the desert country.

The herdsman watched the seasons come and go, and he knew about the long stretches of land over which he roamed. He saw his animals born, grow, and die. He saw the head of the tribe punish his own children

and his animals if they did not obey him, and reward them when they did. Herdsmen thought about these things as they tended their animals.

And so the herdsman came to know that there was a great God who took care of the world and everything in it, just as he himself took care of his own flocks and family. He taught his children to worship this God and to obey Him.

The herdsman also knew that he had to protect his own animals and his family and his servants. Many times he must have thought that the world would be a better place if there were no wild beasts or unfriendly people. And he came to believe that there must be something bad, something evil, which worked against God, just as wolves and bad men and famine worked against him. This evil thing he called Satan.

Some of the thoughts of the herdsmen were made into songs, and you can read them in the Psalms of David, the shepherd boy who became a king.

Herdsmen Had to Plan Ahead

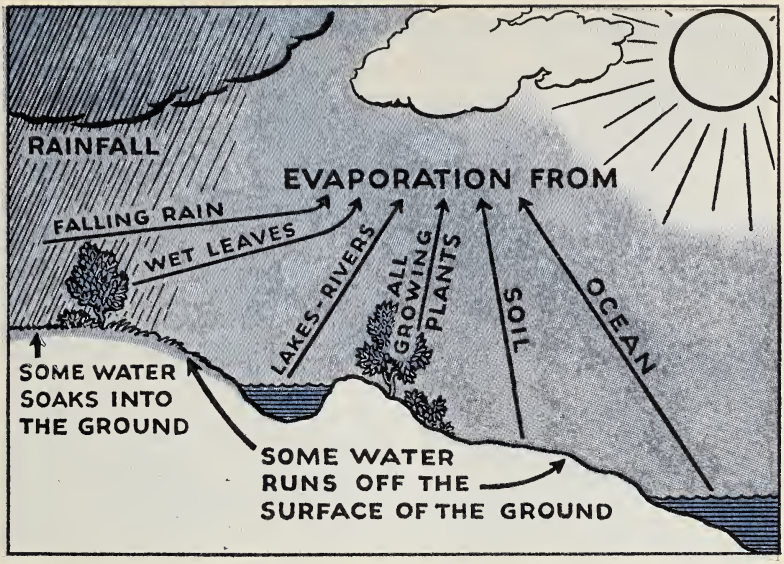
YOU HAVE seen how the herdsmen made more and better use of animals than the hunter. The herdsman had to know many things about animals, more about the land, more about a lot of things than the hunter knew. He had to learn how to plan ahead, because he needed to be sure of sufficient food and water for his animals.

Water is necessary for men and for beasts, and no one knew it better than the herdsman. Not much rain falls in the grasslands, and there are not so many streams as in forest regions. The rainfall map on page 28 and the vegetation maps on pages 45 and 46 show that. The herdsmen in the dry grasslands had

to know where good drinking water could be found, and they always tried to camp near it. You know how important water is if you have ever gone camping, even for just a day or a night.

In the grasslands sometimes months pass without a good rain. The streams become shallower and sometimes dry up entirely. Animals, and men, too, would die of thirst in such a dry pasture land. A good herdsman could tell, by looking over the country, by noticing the kind and color of the plants, where water was likely to be found.

These Arabs are getting water from a well in the desert. The man standing up has just pulled up a bucket of water. His bucket is a bag of sheepskin. The man squatting on the ground has a bigger leather bag that they are filling with water. In the distance you can see dozens of the small bushes that grow in the desert.



This diagram shows what happens to rain. Look up the word "evaporation" in the dictionary if you do not know its meaning.

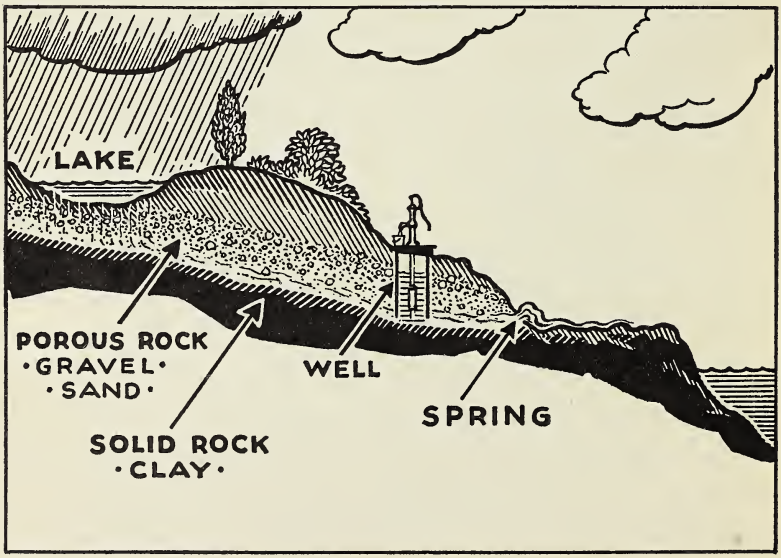
Water in the Ground

A very long time ago some herdsman probably discovered that there was water down under the ground and that he could get it by digging a hole. And so people learned how to dig wells. The ground might be dry, but the smart herdsman generally knew where to find water for his herd and his family.

In times of drought the herder drove his animals along the dry streams down toward the valleys. He knew that water runs down hill and that streams flow together in valleys to make larger rivers. If he went downstream far enough, he would be sure to find water sooner or later. Even if there were no streams in the valleys, there would probably be springs, or water just below the surface of the ground. This water is called ground water.

Ground water is rain that has soaked into the ground instead of running off the surface into streams. When rain falls on bare ground, most of the water runs off, sometimes washing away the soil with it. But where there are plants, more of the rain soaks in, becoming ground water. And where there are forests, there is even more ground water. The roots of plants keep the soil fairly loose, and water can soak in. The dead leaves are porous and the soil holds water, just as a sponge does.

In valleys the ground water is usually near the surface, and people do not have to dig very deep wells to reach it. On the hills it is usually deeper down. Sometimes there is a layer of rock which keeps the water from soaking down farther. Where this happens, the water follows the rock wherever it slants. If the



This diagram shows what happens to water in the ground. Look up the word "porous" in the dictionary if you do not know its meaning. The whole class should learn where your community gets its supply of water. Does the water come from a well, a spring, a lake, or a river? Is it pure, or does it have to be purified in some way?

This picture shows some sheep at a water hole. Notice how the ground is trampled. Does it look as if anything would grow there? Members of the class might collect other pictures of flocks and herds and show them to the class. Pay particular attention to the ground and the grass that show in these pictures.

rock comes out on the surface of the ground, there will be a spring.

Resting the Pastures

THE EARLY herdsmen may not have known all this about water, but they did know many things about water and the land. They noticed that when animals stayed too long in one place they ate up all the grass and trampled the ground. Herdsmen must have noticed that rains washed and winds blew the soil away from these bare places and that plants did not grow there

again. Not only was the food gone, but often the ground was spoiled, too. Herdsmen learned that living plants on the ground ought not to be destroyed.

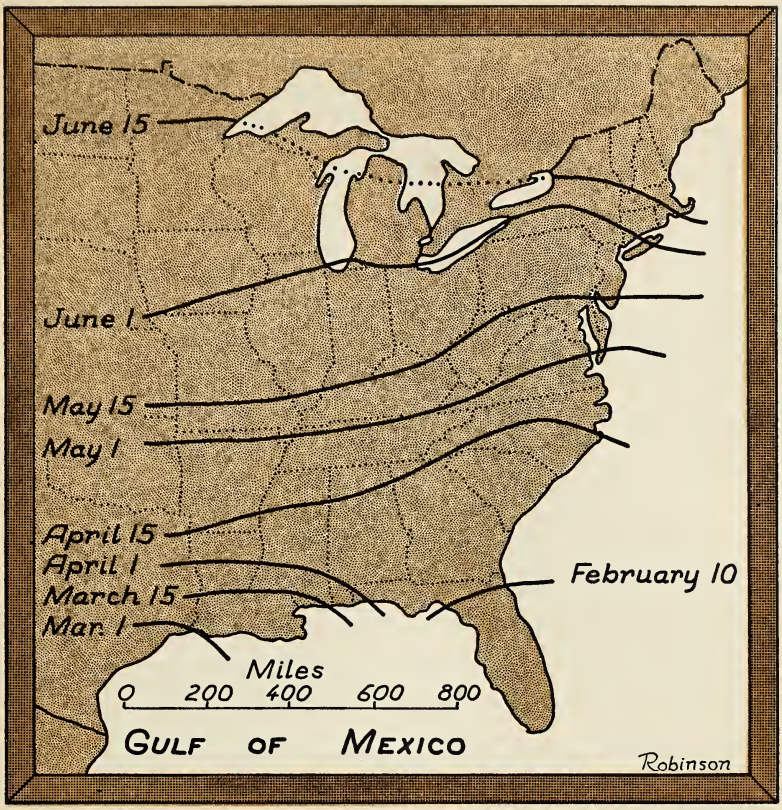
The plants were food for the animals, and the herdsmen knew that their herds would destroy all the plants if they were kept too long in one place. But if the animals just nibbled the leaves from the plants and then moved on, new leaves would grow.

Wise herdsmen gave their pastures a rest and a chance to grow new grass by moving on to fresh pastures. They tried to spend the winters in places where it was not too cold and snowy for the animals to find food. In the spring, as soon as the grass began growing, the herds would move northward.

The Growing Season

THE GROWING season for plants does not begin at the same time everywhere. You may learn something about this if you ask a grocer about the times when strawberries come on the market and the places strawberries come from. In northern lands the growing season begins later than it does in southern, warmer lands. In one place a herd might find young grass that had just started growing. A few miles farther north there might not be any growing grass because that place might still be too cold. The growing season for plants begins about one day later for each fifteen miles you travel north. You could say that spring moves northward about fifteen miles every day.

Fifteen miles a day would be a long march for a herdsman and his animals. But he slowly followed the spring northward. The herd ate the soft young grass where it was and then moved on to fresh pastures. The herdsman knew that several months would pass



This map shows when the first strawberries ripen in different places in part of the United States. Look at the line marked "Mar. 1." On the first day of March strawberries usually are ripe in fields that are south of this line. A few miles farther north the strawberries are not quite ripe. Now find the line marked "March 15." On that date strawberries are ripe in fields south of that line. North of the line, on that date, strawberries in the fields are still green. There is a special reason why strawberries ripen very early in Florida. Perhaps some one who knows about the warm winds and the Gulf Stream will explain this special reason to you.

before he came that way again and that new grass would grow up again.

In the hot summer months, when grass in the valleys became dry and sometimes died, the herdsman drove his animals to the mountains. Spring is very late high

up in the mountains, and the summer is short. Sometimes the snow lingers until June. But the grasses are tender and there is always plenty of water from the melting snows.

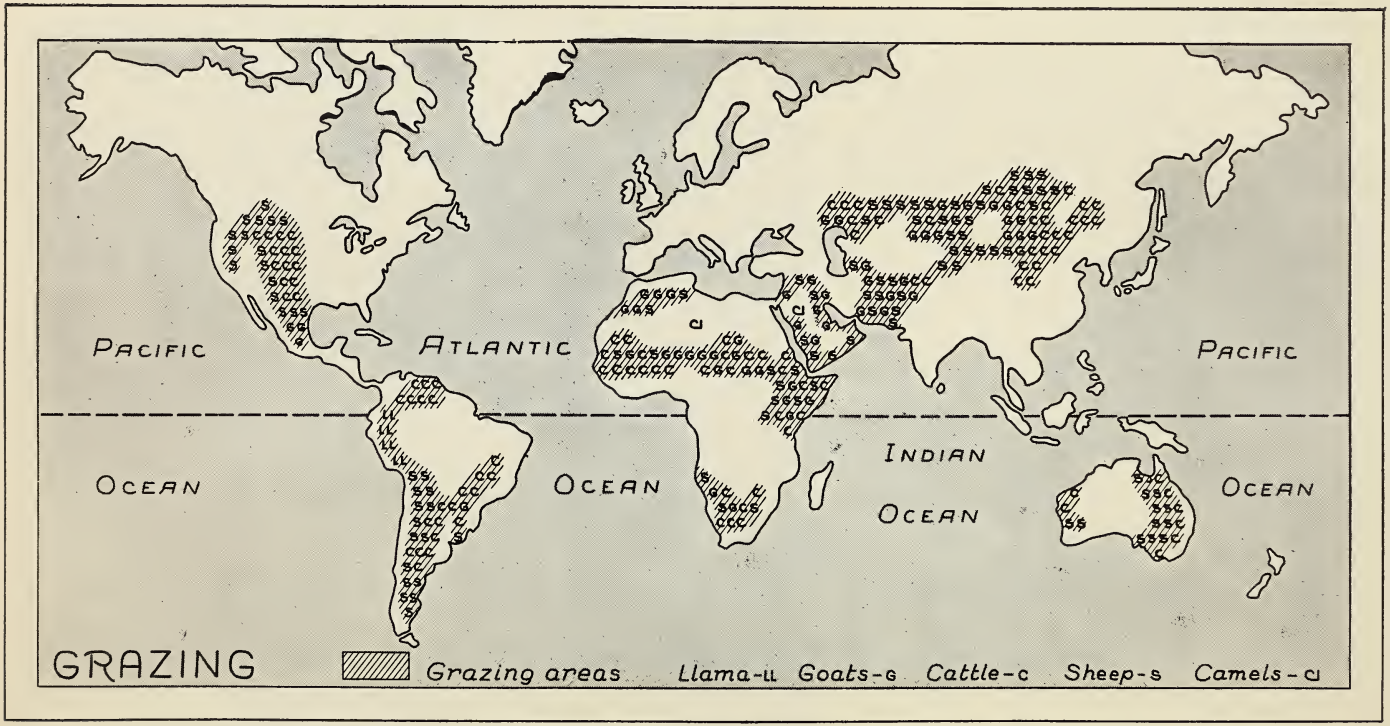
In the autumn, when the mountain pastures became cold and windy, the herders drove their animals down the mountainside and started slowly back toward the south. By this time the grasses had grown again on the pastures where the animals had eaten in the spring. Many of the plants had grown seeds, and the animals grew fat on this nourishing feed as they traveled on.

Herdsmen of Today

In many ways the herdsmen of today carry on their business as herdsmen did long ago. The great herds of cattle and flocks of sheep are tended by men who must move with the animals as they go from one pasture ground to another. They follow the spring northward and up into the higher parts of the grazing country. They follow the autumn southward and down toward the plains.

The grasslands of the earth still support millions upon millions of animals in herds. The map on page 99 shows the grazing regions that are used to provide food for cattle, sheep, goats, and other animals. There is a lot of this land, as you can see by the map, but there must always be a lot of land where animals can graze, because most people cannot live without animal products, and lots of animals must be raised.

Many thousands of people, in different parts of the world, are in the herding business, making a living for themselves by supplying other people with meat, with hides or wool, and with other products that we get from animals.



On this map of the world are marked the most important grazing lands for different kinds of animals.

Of course many animals, such as cattle and sheep, are raised on small farms in small herds. Part of their food must be grown in fields by the farmer, because his pastures are too small to furnish all the food needed.

There are also parts of the world where the herds of animals are of a special kind. In Lapland, for example, the people have herds of reindeer. Sheep and cattle would starve to death in the cold, snowy country of the Lapps, but the reindeer can live on the moss which grows underneath the snow. In parts of Asia and Africa, camels are raised, for the camel is especially useful in desert lands. It can eat the dry thorny plants of the desert and can go a long time without water.

In some parts of South America herdsmen raise the llama, alpaca, and vicuña. The llama is useful for carrying loads, and all these animals are valued for their fine soft hair from which beautiful warm cloth is made. In parts of Asia elephants are kept to do work for men. And in other parts of the world herdsmen care for droves of horses, donkeys, and mules.

In the drier regions of North America, as well as on other continents, large herds of animals are kept. In these places the land is not very good for farming, as there is not enough rain. But there is rain enough to grow some grass. Even when the grass is scanty and poor, the herds can still find enough food if they spread out. Perhaps you have ridden through what is called the cattle country. If you have, you probably did not see many cattle, because they were spread out.

Because the herdsman can usually sell his animals for money, he sometimes tries to raise too many. He may raise more animals than can be fed on the grass

These beef cattle were shipped in freight cars from a ranch in Montana to this farm in Illinois. The Illinois farmer who bought them will feed the cattle until they are fat. Then he will load them into motor trucks and take them to the stockyards in Chicago.

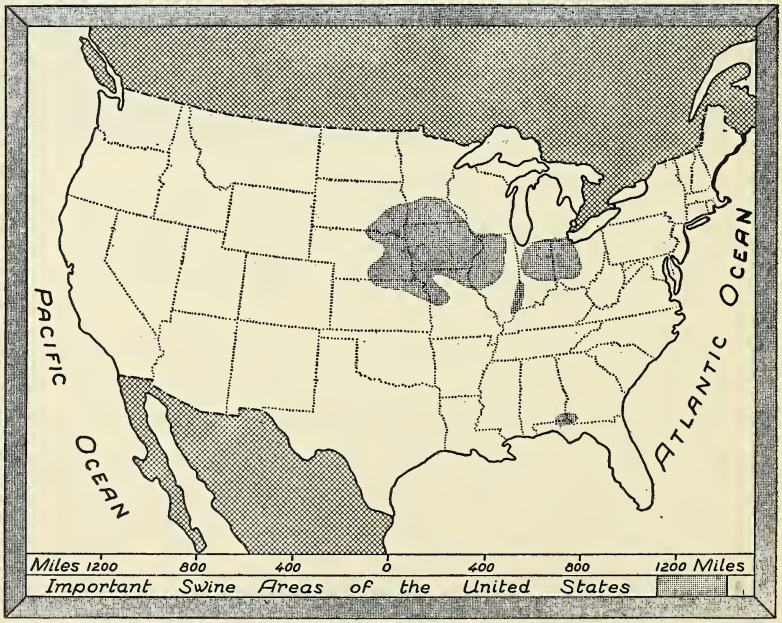
in the region. Or perhaps extra dry weather keeps the grass from growing as usual. Or the grass may be trampled out by the cattle and replaced by too many weeds. When any of these things happen, the herdsman has trouble. His cattle may starve. He will try to sell them for any price before they die.

In some places the grasslands have been ruined because the grass has been destroyed. Sometimes too many cattle have been pastured there, all the grass has been eaten up, and the ground has been trampled

bare. Sometimes, instead of being used for pasture, this land has been plowed up and crops have been planted. Then the farmers discovered that most of this land would not raise good crops year after year. If the farmer moved away, probably the dry soil would be blown off by winds. These are some of the reasons why herdsmen of today are learning that they must take care of the land or they will not have good grass and well-fed herds.

Cattle, Sheep, and Hogs

Most of the cattle and sheep in the United States are raised on large ranches in the grassland region which we call the plains. Few of these cattle and sheep are fat. They have to work too hard to get



Hogs are raised on many farms in most states, but most of the hogs sold in the United States come from farms in places that are shaded on this map. Did you know that hogs are called swine?

The Iowa farmer who owns these hogs raises corn and feeds the corn to the hogs. He does not buy much feed for them.

enough food from the scanty grass. And the grass they do get is not the fattening kind. Cattle and sheep from the ranches are usually shipped to feeding farms in other parts of the country where the climate is moister and feed is more plentiful. On the feeding farms the animals are fattened on hay, grain, silage, and other feed. When they are fat enough to sell, the animals are shipped to stockyards and packing houses.

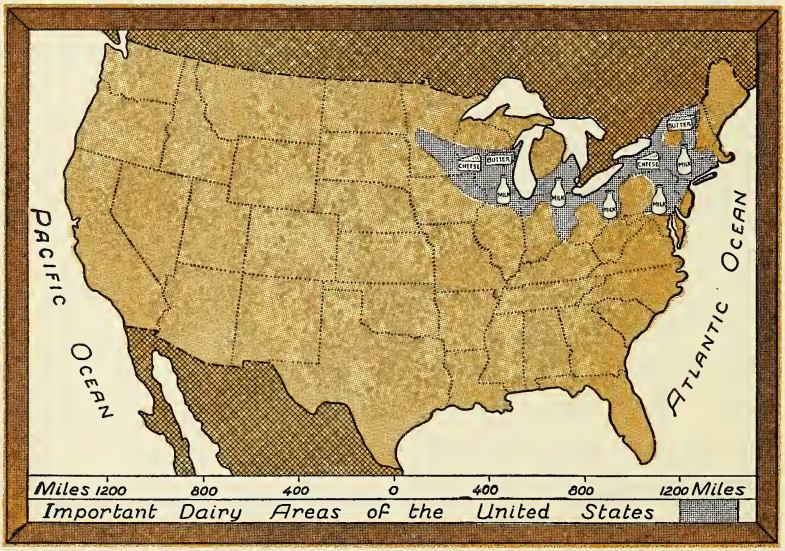
The stockyards and packing houses, where animals are killed and meat is prepared, are usually in large cities. Most of our large cities are in the moister parts of our country, and so packing houses are generally near the feeding farms.

The hogs that are sent to packing houses do not come from the ranches where sheep and cattle are raised. Although pigs can live in the forest, where they can run about and root in the ground for food,

only a few hogs are raised in wooded places. Most hogs are raised on farms where there is plenty of grain. They fatten well on corn, and places where corn is raised are the places where most of our hogs are raised.

Dairy Cattle

Good farming country is best also for dairy cattle. To produce rich milk, cows need plenty of water and grain, as well as grass. They must be well cared for and protected from bad weather. Because milk cannot be sent very far without spoiling, dairy farms must be fairly close to the big cities where the most milk is used. If you ask the milkman where the milk



The shading on this map of the United States shows the most important places in the dairy business. Dairy farmers close to the big cities usually sell their milk to city dairies that bottle it and deliver it to people's homes. Other dairy farmers sell their milk and cream to butter factories, to cheese factories, and to plants that can condensed, evaporated, and powdered milk. Do you know where the milk you drink comes from? How does it get to your home? A class group should report on the milk supply.

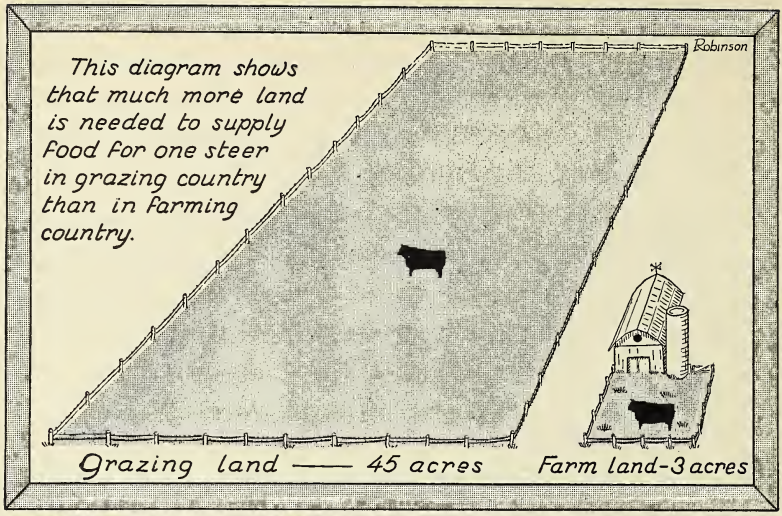
you drink comes from, you will find that it does not come very far. Of course, milk can be manufactured into butter or cheese, or made into evaporated, powdered, or condensed milk, and then it can be shipped much farther than fresh milk.

On pages 116 and 117 are some suggestions about visiting a dairy. You could use the same suggestions if you have an opportunity to visit a creamery or any kind of factory that makes products from milk or cream.

The Work of the Herdsman and of the Farmer

PERHAPS you have already noticed the difference between the work of the herdsman and the work of the farmer who raises a few animals. The herdsman lets his animals graze on land where their food grows wild. The farmer who raises animals not only has pastures for them but also grows some food for them. He must know what kind of food they need and then must plan to grow enough of it in some of his fields. He must plant and cultivate and harvest most of the food for his animals.

We might think that it would be much easier and cheaper to let animals graze on food that grows wild. Certainly a big herd of cattle on a ranch does not need so much care as a big herd of cattle on a small farm. On the ranch only a few men are needed to watch the herd and to keep it together. But on the farm men must plant seeds, cut hay, husk corn, haul feed to the cattle, pump water for them, build sheds, and do dozens of other jobs. Animals on farms require much more work by men than animals on the big western ranches.

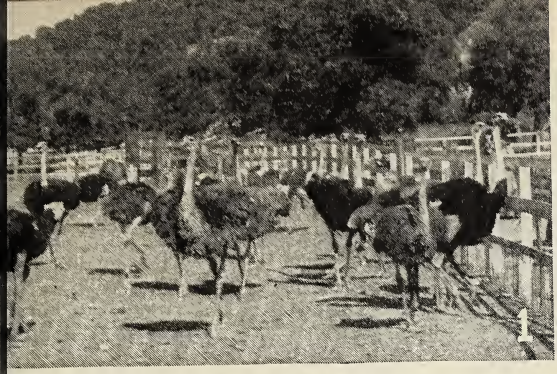

This diagram shows that much more land is needed to supply food for one steer in grazing country than in farming country.
Robinson
Grazing land —— 45 acres
Farm land-3 acres

Look at the picture on page 85 before you study this diagram. On poor grazing land the grass is thin and scanty. A single beef animal, sometimes called a beeve and sometimes a steer, will eat in one year all the grass that can grow on 45 acres of this poor land. On better land, about 30 acres will grow enough grass for a steer to eat in a year. Now turn to the picture on page 101. On three acres of good land like this, a farmer can raise all the feed a steer eats in a year.

Although raising animals on farms means more work, less land is needed for cattle and sheep on farms than on ranches. With good land the farmers can raise a great deal more feed than the dry grasslands will grow.

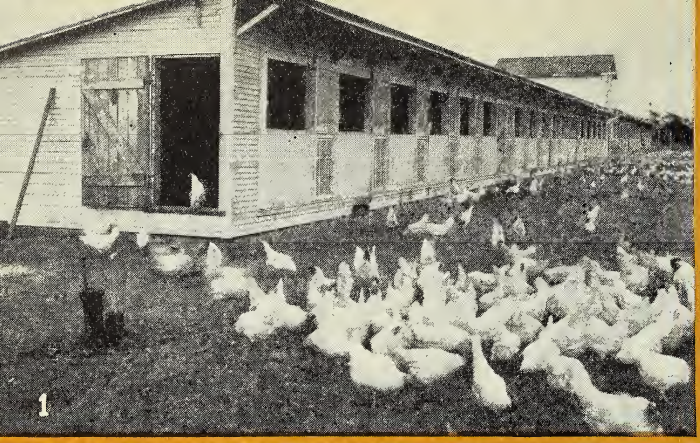
Fur Farms and Pet Farms

CATTLE, sheep, hogs, and horses are not the only animals that farmers raise on small farms. Men have studied other animals and have learned to feed and care for many kinds besides the common farm animals. There are farms where foxes are raised for their furs. Muskrats and rabbits are raised on farms, also. Turtles, alligators, and even snakes are sometimes raised on farms.

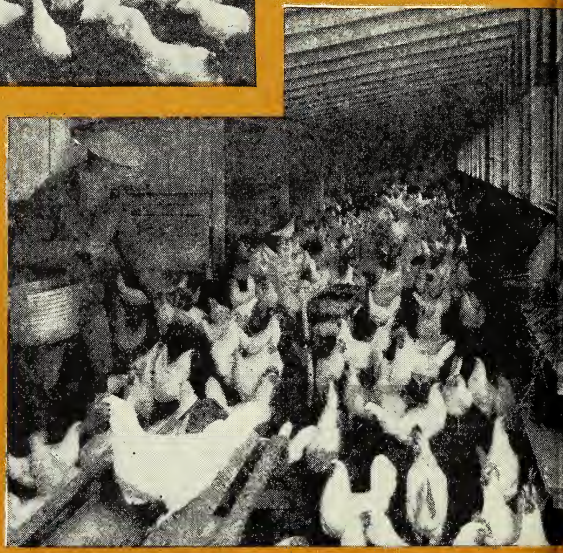


This page of pictures shows some unusual animal farms. Picture 1 was taken on an ostrich farm. Picture 2 shows part of a beaver farm. Fences divide the land and water into narrow runways for the beaver families. Their huts are like wigwams made of poles. Picture 3 shows a raccoon farm.

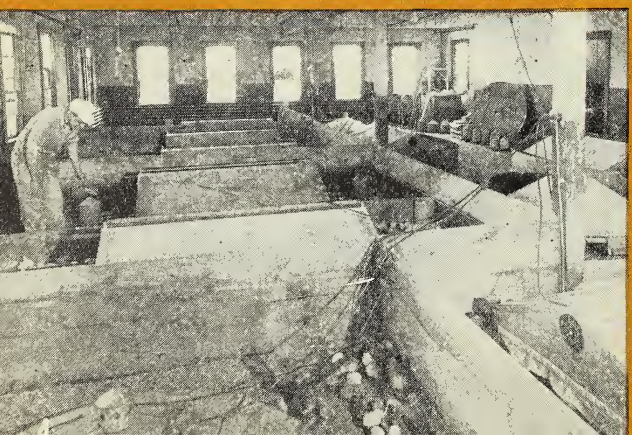
Picture 4 shows one of the pens on a fox farm. Picture 5 was taken on a terrapin farm and shows the stream and its banks where this kind of turtle lives. Picture 6 shows a muskrat farm. You can see at least two of their houses.



Picture 1 shows the outside of a building on a chicken farm. Picture 2 shows the inside.



Picture 3 shows a different kind of poultry farm. The hens are kept in cages and carefully fed so that they will lay many eggs. Pictures 4 and 5 show baby chicks. Are there poultry farms in your community that you can study?



Farmers who raise these animals do not need nearly so much land as the animals would need if they ran wild. One farmer who raises foxes selected a small island for his fox farm. The island would be large enough for only three families of wild foxes, if the foxes ran wild and had to hunt their own food. But each year this farmer now keeps more than two hundred families of foxes on this island. Of course he supplies them with their food and they do not have to hunt. The food is raised on other land and the fur-farmer buys it. We might say that the farm is really bigger than the island. It would have to be if the fur-farmer raised all the food his animals ate.

Raising pets is a business, too. Some are raised on farms, some in homes. Not much room is needed to raise dogs, cats, or rabbits, which are the commonest pets of all. Perhaps you have passed farms or places marked "kennels" where dogs are raised and sold.

Tame Birds

A COMMON pet is the canary bird. Men have been raising canaries for many many years and training them to sing. Like other animals that have been tamed a long time, the tame canaries we see today are not very like the wild ones that may be found in many parts of the world.

Canaries are not the only birds that are raised for pets. Parrots, cockatoos, and love-birds are often seen in the pet stores. But birds sold in pet stores are only a small number of all the birds raised by people. Most birds are raised because they are useful for their eggs or meat. Such birds are called poultry. Chickens, ducks, geese, turkeys, and guinea fowl are the most useful. On some farms they scratch for their own food, but on

other farms they must be fed on grain, vegetables, milk, and other foods. These foods are produced on farms, particularly farms in the moisture regions. Because the eggs and meat of poultry are easiest sold in cities, poultry farms are usually in regions where there are many cities and towns.

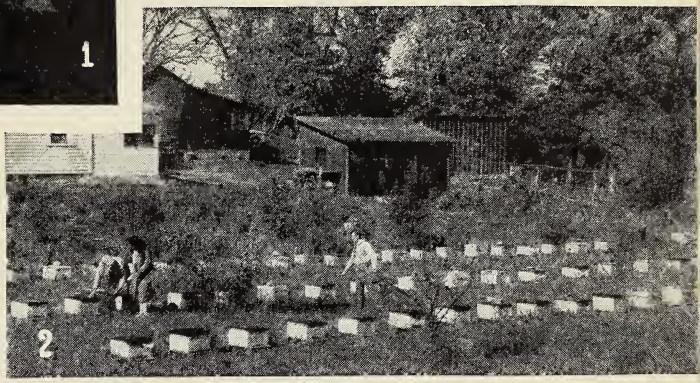
The modern poultryman is as careful about the kind of birds he keeps as the man who raises good cattle, fine sheep, or fat hogs is careful about the kind of animals he keeps. The poultryman knows that a good hen may lay as many as two hundred eggs a year and not eat any more food than a poor hen that lays only fifty eggs a year. He knows that he must keep his birds clean and free from disease. He must protect them from the weather and not let them run about too much. Men who raise poultry have jobs that in many ways are like the jobs of men who raise other kinds of animals.

Making Use of Insects

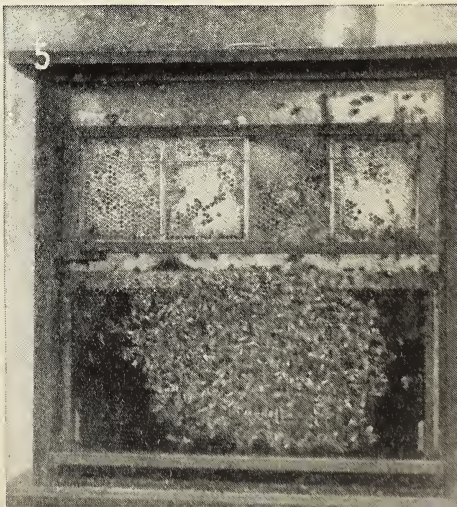
All these animals are not the only ones that man has managed to keep for his own use. For many centuries men have known ways to make bees work for them. No one knows how long ago people began using the honey and wax that bees make. Long before anyone knew how to make sugar, honey was used to sweeten things. In most of the countries of the world farmers have kept hives of bees.

Bees are useful in another way. They carry pollen, a fine yellow powder, from one fruit blossom to another. The blossoms of some plants will not grow into fruit unless pollen from other blossoms touches them. Bees carry some pollen away from every blossom they visit, and some of it rubs off on the next flower. Men with orchards often keep bees to do this work, or sometimes

Picture 1 shows a bee on a flower. A live bee on a real flower would be a little bit larger than the bee you see in this picture. Picture 2 shows part of a bee farm. The bees live in the hives you see in three long rows. But they do their work in orchards and gardens for miles around. Each bee can find her way back to her own hive and never tries to enter one of the other hives.



Picture 3 shows a swarm of bees. They have left their old hive to start a new one of their own. If the beekeeper does not get them into a hive, they will fly away and find a hollow tree somewhere. Pictures 4 and 5 show the inside of a hive. You can see the bees at work, making a honeycomb and filling combs with honey.



Picture 1 shows the eggs from which silkworms hatch and also the moths that lay the eggs. Picture 2 was taken in Syria and shows trays full of silkworms feeding on leaves. Picture 3 shows worms spinning cocoons. Picture 4 shows a cocoon market in India.

A group in your class might read about silkworms and report to the class.

they rent hives of bees from beekeepers so that they will be sure to have a good crop of fruit.

Another useful insect is the moth which lays the eggs from which silk worms hatch. In China, many centuries ago, people discovered a way to unwind the fine silk from cocoons made by silkworms. According to the story, a Chinese princess first learned to unwind this silk and twist it into thread. For a long time the Chinese were able to keep their way of doing this a secret. But the secret got out, and now silkworms are raised in many other parts of the world besides China.

Animals for Men to Use

In one way and another men have been able to make use of insects, birds, and other creatures. They have discovered better ways of using them than just by hunting and killing the animals as they were needed. You have read how men tamed animals and learned to care for them in herds. And you have read how men raise animals on farms and supply them with food that is grown specially for them.

As men discovered these ways to raise animals and to use the products of animals, such as wool, hides, silk, and other things, they learned more and more about this world we live in. Men not only learned more about the animals, but more about themselves.

In this chapter you have read how men use animals to meet their needs. Many of your needs are supplied by animals or by animal products. If you saved the list you made when you studied Chapter One, you can look over the part marked *Animals*. Perhaps you will be surprised to see how many animals are used in meeting your needs.

Take this old list and divide it into four lists, or make a new list if you prefer. Put down these words at the head

of each list: (1) Animals That Work, (2) Animals That Supply Food, (3) Animals That Supply Clothing, (4) Animals That Supply Unusual Things.

You may not put anything in the fourth list for some time, but as you study how we use animals, you will learn of animals that supply you with unusual things. Then you can add them to the list. Ask your parents if they know of any such animals and what needs are supplied by them. Watch for such unusual things in your reading. For example, cod fish supply us with cod liver oil, which we give to babies, children, and sometimes to grown people as a kind of medicine.

Perhaps when you studied Chapter Two your class was divided into committees that made a report on the region where you live. A good report about your region would give you a lot of information about the animals that are raised there. If you saved the regional map you made, you can put animal pictures, or symbols, on it, in very much the same way you put down symbols for the plants. The following symbols might be used:

Poultry and Eggs

Fish

Beef Cattle

Sheep

Hogs

Horses

Dairy Products

Fur Bearing Animals

Before putting these little symbols on your map, be sure you know where to put them. If you live in the country, your county agent or the Farm Bureau of your county will have information you can use. If you live in the city, you can consult books such as the *World Almanac* or encyclopedias. Look up the states that are in your region and read about the animals raised.

In this chapter you have also read about animals that have been tamed and taught to work. You have probably seen some animals working on the streets of a city, or working in fields and on farms. Others, such as the camel and elephant, you may have seen in a circus or at a zoo. But they were on exhibit and were not working. Can you think of other animals not mentioned in this chapter that are used for work? You will find it interesting to make a chart, like the one following, listing the animals that have been taught to work, where the animals are used, and what they do.

Animal	*Where Used*	*For What*
Horse	North America South America Europe Northern Asia Australia	To carry people To carry burdens To pull heavy loads To plow and do other work on farms
Elephant	India	To carry people and burdens; pull loads

There are many animals to put on this chart. If some pupils would rather make drawings, they might make a large map of the world and locate the animals on it by drawing little pictures, very much like the symbols used on the regional map.

You have also learned that men use animals to supply us with food. Men have learned to raise cows that give more and richer milk; they have learned to raise chickens that lay more eggs; they know how to care for animals so as to have fat, healthy cattle, sheep and hogs to send to market. You have learned where the cattle and sheep pasture lands of the United States are. Turn to the vegetation map on page 45 and locate these lands on the map. Then turn to the world map on page 46 and locate other places in the world where you find the same kind

of vegetation. Compare this world map with a large wall map that gives the names of the countries. When you know the names of the countries, you can look them up in an encyclopedia and find if cattle raising and sheep herding are important. Last of all, you can make sure you are right by turning to the map on page 99.

There are stories and songs about the life of the herdsman. Ask your music teacher to teach you some cowboy songs, such as *Home on the Range*. If you look through a song book you will probably find songs about shepherds, too. Of course, a song does not always tell you the true story of what it describes. Very often it makes things seem much more pleasant than they really are. If you have ever visited a ranch, or if you live in the cattle country, you can tell what you have seen or heard. Or perhaps you can get someone who has been a cowboy to talk to your class. Then you could write a paragraph describing the life of an American cowboy. You could show how his work and his life is different from the life of the old-time herdsman described in this chapter.

The Twenty-third Psalm is a beautiful poem. You may want to memorize it. It would be interesting to pick out the parts which prove that the author of the psalm knew a great deal about the life of a herdsman. You might write a paragraph comparing the duties of a shepherd today with those which David, who wrote the psalm, said were the duties of a good shepherd in Bible times.

Dairies are now run carefully and are inspected by government officials to see that you get clean, rich milk. Perhaps your class can arrange to visit a dairy in the neighborhood. In city dairies you can see how the milk is bottled. In country dairies you can see how the cows are fed and cared for, how they are milked, and what is done with the milk to make sure that it is clean and good.

1. Someone should write a letter asking for permission to make the visit. The letter should say why the class wants to make the visit, what the pupils hope to learn, and how many will go. As you will be guests, you should ask when it would be convenient for you to come. You might each write a letter and then let the class decide which letter should be sent.

2. Plan carefully what you want to see. It would save time if you made a list of questions you wanted answered. Of course, that would not mean you couldn't ask other questions.

3. Remember that you are guests and people will expect you to behave well. You might discuss in class the things you should remember to do when you are in a public place. Perhaps you could agree on a list of "Shoulds" and "Shouldn'ts."

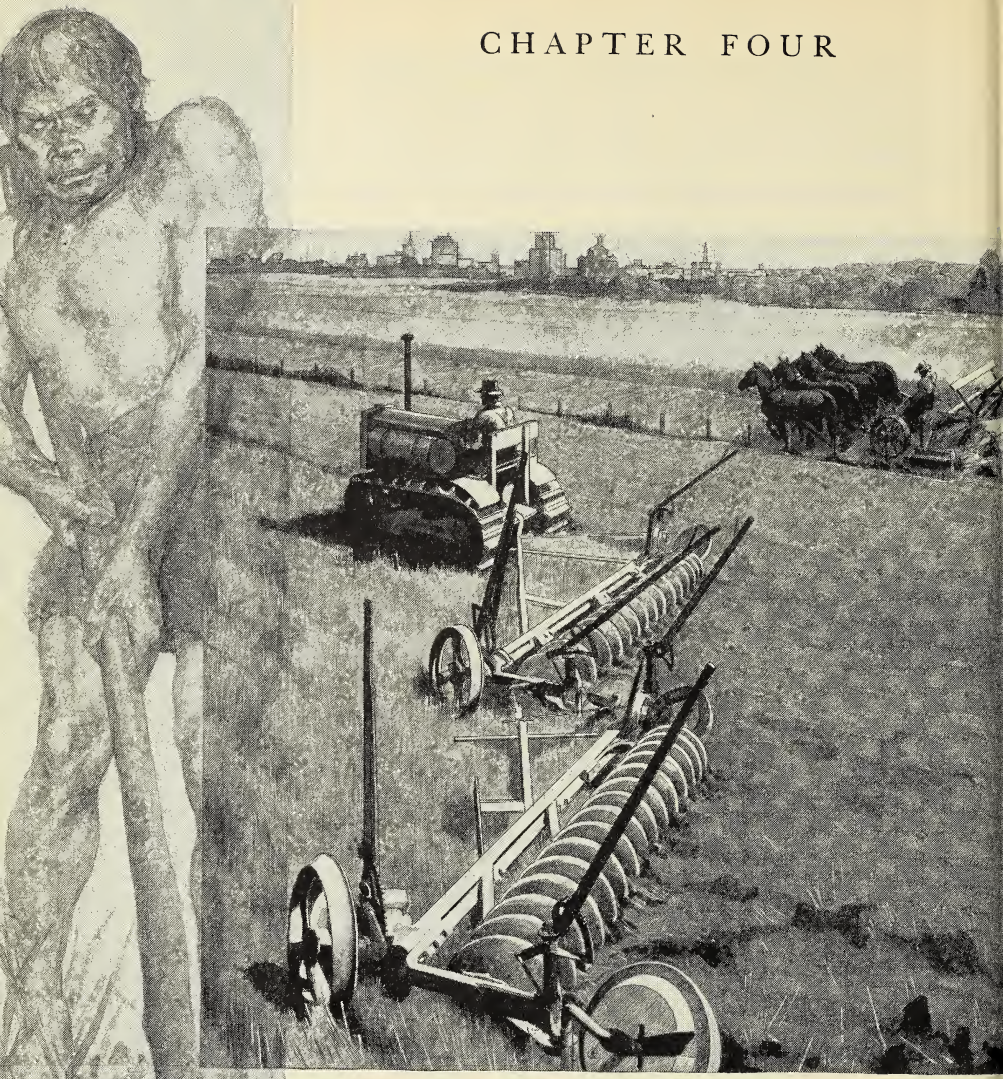
A "Thank You" letter should be written after you return from a trip to each person who helped you.

One of the things the government does for us is to inspect the food we buy. If you visited a dairy you probably learned something about inspecting milk. If you did not, you can find out something about it by asking your milkman what *Grade A* means, what *pasteurized* means, and how he knows that the milk is pure. You might bring to class the caps from milk bottles and examine them to see what they tell you about the milk. You might also ask your butcher to tell you something about the way meat is inspected to make sure that it is good.

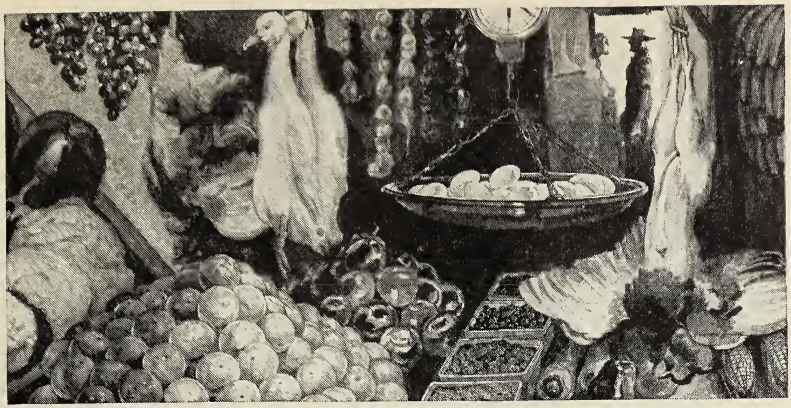
Words to add to your glossary:

nomad	droves	steppes
herds	ground water	flocks
shepherd	herdsman	property
poultry		drought

CHAPTER FOUR



THE FARMER



Some farmers raise things we do not eat, but most people think of farms as places where men work to raise food.

Farming Was Once a New Way of Living

HUNTING and herding were not the only ways in which early people could make a living. They gradually learned how to make a living by farming. We do not know just when men first got the idea of farming, nor do we know exactly where the first farming was done. But we do know that men in different parts of the world, thousands of years ago, had discovered that they could raise plants for a living.

Some of the very first farmers were probably people who had been hunters. Others had been herdsmen. Perhaps many of them kept on hunting, or herding, while they did some farming. All we can be sure about is that long ago our early ancestors found a new way to make a living—by farming.

Hunting peoples have known always that plants are useful. People who live by hunting often hunt wild plants as well as wild animals. They gather nuts, berries, and other fruits. They dig up fleshy roots and thick underground stems which can be eaten. They

This model in a museum shows some Indians gathering wild rice in Minnesota. They bend the stalks over their canoe and beat out the ripe grain. Wild rice still grows in many northern lakes.

use buds and leaves to flavor their cooked meat, just as we use cloves, which are dried buds, to flavor a baked ham or bay leaves to flavor a meat loaf.

Hunters often use the wood of trees for fuel and for making useful objects. They may make baskets of twigs or of grasses. And they may know how to get tough fibers from plants and twist them into ropes or spin them into thread for making cloth. Often they know how to use certain plants for medicines and how to use others for dyes with which they stain their bodies, clothing, baskets, and other things. They find many ways to use plants besides eating them. The early hunters discovered some of these ways.

What the early hunters learned about plants was told to others. Perhaps herdsmen were neighbors of hunters, and each learned what the others knew. Perhaps

a hunter was the grandfather of some herdsmen. And the herdsman also learned about the wild plants on which his tame animals fed. His herd grazed on grasses and herbs that grew in the fields. They also browsed on the tender shoots of trees and shrubs. As the herdsman watched his animals feeding, he learned what plants they liked. And he learned that some plants might make them sick or even kill them, as the buckeye seeds sometimes kill cows today.

Men Learn about Seeds

THE HERDSMAN must have noticed that his animals were specially fond of certain grasses when the seeds were ripe. He must have noticed, and perhaps the hunter noticed, too, that grazing animals grew fat on those ripe seeds. Hunters and herdsmen often gathered the larger kinds of grass seeds for their own use. The women found ways to use these seeds for food, and finally learned to cook them.

When men discovered that they could gather and use plants, or the seeds and fruit of plants, they had taken one step toward becoming farmers. But they still had to find out that they could raise plants—on purpose, we could say.

We know that plants grow from seeds, but long, long ago, people did not know that. We know that if we scatter seeds some of them will grow. But when the early hunter or herdsman threw away fruit stones or dropped some grain, he did not know that he was scattering seeds which might grow into plants. If the seeds sprouted where he dropped them, and plants grew up, he did not know that the plants came from the seeds. Not for many thousands of years did people know that.

We know that plants come from seeds because we can watch them grow. This is easy to see if the seed is very big, like a coconut. But it may have been many thousands of years before men began to look at sprouting seeds and really see what was happening.

At some time or other, someone did find that plants came from seeds. Perhaps a hunter brought home some berries that grew a long way from the place where he lived. Next year the same kind of berries were growing right by the pile where the garbage was dumped. Or perhaps a herdsman's wife dropped some grain when camp was moved. Next year, when camp was made in the same place, she found some growing plants that were not there before. Something like this must have happened many, many times before people figured out that plants came from seeds.

In some way or another people did find out that they could plant seeds and those seeds would grow into plants like the ones from which they came. When men found that they could raise plants from seeds, they had discovered a new way to make a living. This was an important discovery—certainly as important as any ever made. Try to imagine what life would be like today without any farming.

Even today men have not discovered all there is to know about farming. Certainly those early people must have learned about farming very slowly. Perhaps for a long time men dropped seeds just anywhere and thought they were lucky if some of the seeds grew. Many, many years must have passed before people discovered that the kind of place where seeds were planted was important. But as time passed, they learned that some kinds of seeds grew best in certain places, while in other places few seeds would grow.

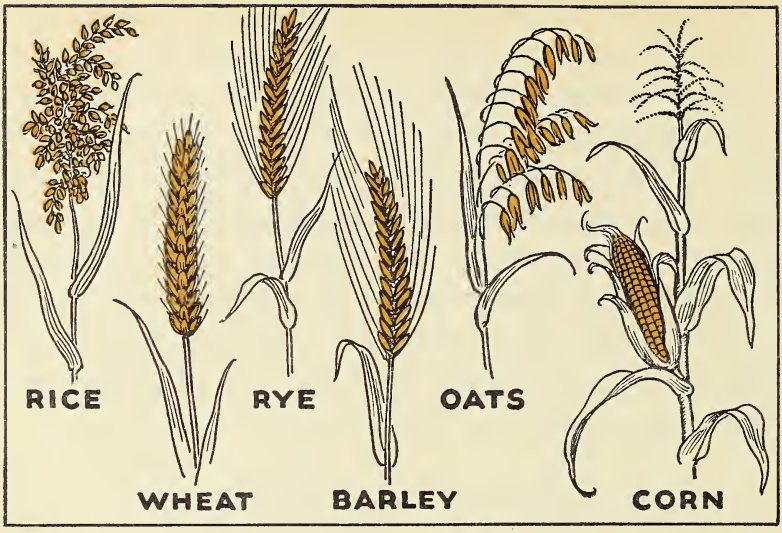
Probably seeds were just scattered over the surface of the ground year after year before anyone thought of actually putting them in the ground. Then some young farmer might have tried covering the seeds with dirt. Perhaps he did it so that the birds could not eat so many, perhaps because his grandfather told him not to, or perhaps just because he wanted to see what would happen. But no matter how, men discovered that more seeds sprouted when they were covered up. They learned that some seeds needed to be planted deep, others not so deep in the ground.

Taming Wild Plants

And so little by little men learned about plants. We could say that they tamed the wild plants in somewhat the same way that they tamed the wild animals. This happened at different times in different places. In the moist lands of southeastern Asia, men learned to grow rice. The rice growers also tamed other kinds of plants. We got the peach tree and the cucumber from their part of the world.

In America Indian tribes of Mexico found and grew a plant called maize, or Indian corn. No one in our time has ever found wild maize growing. Men who have studied it are fairly certain that maize, like rice, must have been tamed a long time ago. Other Indian tribes also learned how to grow corn, and many of the tribes had legends about it. In Longfellow's poem *Hiawatha* you will find one story of how maize came to be grown by Indians.

Indians in North America also learned to raise other plants, especially beans and squashes. In South America they raised potatoes, tomatoes, and peppers, as well as other vegetables.



Perhaps your class might make a collection of grain. Stalks with the heads or ears containing grain are not easy to get in some parts of the country. But with a little trouble samples of the grain itself can be secured and can be displayed in bottles.

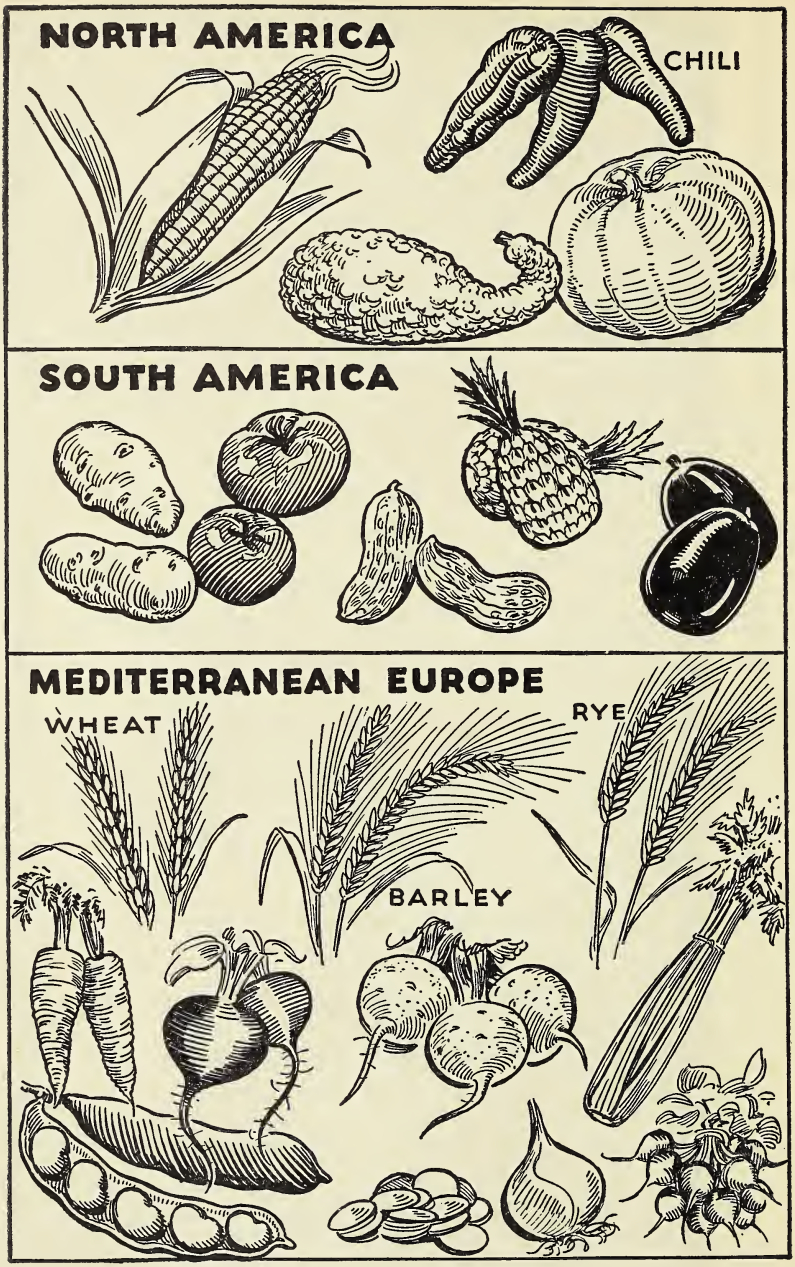
At the eastern end of the Mediterranean Sea, where Europe touches Asia, and Asia and Africa come together, men first grew the wheat plant. Other plants first raised by men in this part of the world are clover, alfalfa, onions, olives, figs, grapes, and peas.

The most important plants that men tamed were the kind of grasses called cereals. Corn, rice, wheat, oats, rye, and barley are different kinds of grasses. The seeds of these plants are nourishing and, best of all, keep a long time without spoiling. Ground-up seeds of some cereals are used for bread.

Farming Changed People's Ways of Living

YOU HAVE read how learning to herd sheep, cattle, or other animals made a great difference in the lives of people. Farming made a still greater difference in the ways people lived.

Grain is raised in many parts of the world, but the shaded areas show the most important grain-raising places.



Early farmers in different parts of the world discovered that they could grow certain vegetables as well as cereals. The pictures show the vegetables that were grown together. Can you find lentils?

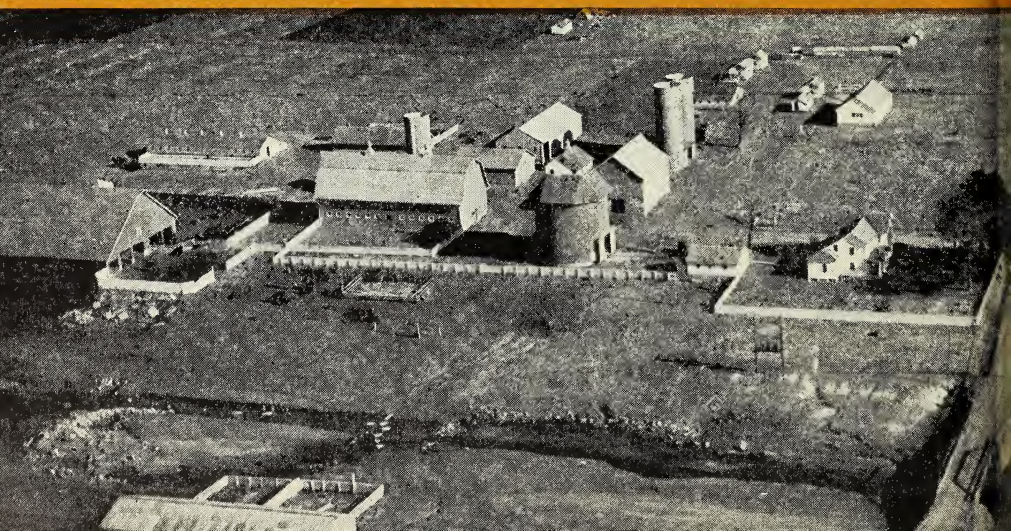
Some hunters or herdsmen would plant gardens before leaving their winter homes. Then when they came back in the autumn they would gather whatever the birds and animals had not eaten. Others planted gardens wherever they could, even hiding them, and picked the food when it was needed. But gradually the farmer found that he needed to stay near his fields and look after them.

The farmer who went to the trouble of planting seeds and taking care of the land and the growing plants did not want to move. He had to stay and gather his grain and vegetables or else go hungry. Even after harvest time he probably would not want to move, because the work of plowing and preparing new land for planting was too great. Farmers did not move about from place to place as hunters and herdsmen did. They preferred to settle down and live in one place. That made a great difference in the way they lived.

When people stayed in one place instead of moving about, they could have better homes. People that settled down and became farmers could pay more attention to the place where they lived than hunters or herdsmen could. A cave was all right for a hunter who might wish to move any day. A tent was a good home for a herdsman who knew that he would have to pack up and follow his animals to another feeding ground. But a farmer, who intended to live in the same place year after year, would want some kind of house.

The simplest kind of farm house is a one-room hut, but as time went on, most farmers needed a better home. If a farmer wanted to, he could build a separate room for sleeping, or a special room for cooking, or

The Eskimo hunters in Picture 1 can get all their belongings into a single hut. The Indians in Picture 2 can pack up and move in a short time. Even the trapper whose cabin you see in Picture 3 does not have so very many things to move. But you can see that the farmer who lives on the farm in Picture 4 has many things to take care of.



a room for storing seeds and vegetables. Some of the neighbors of the man who first had a special room for sleeping must have thought he was pretty smart. Others probably thought he was crazy. Houses became better after people began living on farms and staying in one place.

The farmer who stayed in the same place year after year and had a house there probably put a great deal of work on his land. Naturally he came to think of the land as belonging to him. Owning the land and keeping other people from using it were much more important to the farmer than to the herder or to the hunter. The hunter could pack up his weapons and move to another place without much trouble. He could make a living as soon as he found a place where there were wild animals to kill. The herdsman could drive his tame animals to another pasture ground and go right on living as he had always lived. But the farmer could not move to another place so easily. Unless he had grain saved up, his family might starve before he could raise another crop. It was much better for him to stay and keep for himself the land where his crops were already growing.

Farmers Needed to Own Many Things

Land was not the only thing the farmer needed to own. With a house and a place to keep things, the farmer could own many more things than a hunter or a herdsman. The hunter did not need much besides his weapons and something to cook his food in. If he had to follow the wild animals, he had to carry all his belongings with him. He did not own very much. The herdsmen also did not burden themselves with many belongings.

But the farmer, who lived in the same place year after year and intended to stay, could own many things. He could own tools for taking care of the land, for making butter and cheese, for building, for cooking, and for doing other kinds of work. Owning all these kinds of property made quite a difference in the way people lived.

Owning different things also made a difference in the way people thought and acted. People are proud of the things they own. They take care of things that belong to them. Maybe you have a little brother and can remember when he began to think that certain things were his very own. Or perhaps you have a little sister who is very proud of her doll. Certainly you can think of some things that your father or mother are proud of owning. People have been that way since they first began to own things.

Because people are proud of the things they own, they like to own better and better things. A boy who is making a collection of something, whether it is weeds or butterflies or stamps, wants to have a bigger and better collection than others have. The farmer of long, long ago wanted to own better things than other people, too. And so some of them thought of ways to improve the things they owned and to make them better. Lots of things were improved because the owners wanted something better than their neighbors had.

The earliest farmers did not have iron or steel to make tools. At first they used just about the same kinds of tools that the hunters and herdsmen used. They had sharp sticks and tools of stone or bone to dig up the earth. But, as time went on, farmers improved old tools and invented new ones. The sharp

In some parts of the world, even today, farmers are still plowing with sticks of wood. The plow in the picture is a Mexican plow.

stick used for digging was improved and became a shovel. The short-handled hatchet probably gave someone the idea of making a long-handled hoe. After a long time, farmers learned how to make plows of crooked tree branches and taught tame oxen to pull them. These first plows could not break up the ground very deeply, nor could they plow ground that was very hard. They look very simple and crude to us, but the owner of the first one was probably pretty proud of it.

Where the First Farming Was Done

THE EASIEST places for early people to farm with such simple tools were open spaces in the forests where the soil was fertile and not hard to dig, and along rivers where the soil was loose and rich.

Many of the great rivers of the world start high in the mountains where there is plenty of rain or snow.

This simple map shows where two great river valleys are located. For a great distance the Tigris and Euphrates rivers have one valley. To find what that distance is, copy the scale at the bottom of the map on a piece of paper. Use the paper like a ruler.

After they leave the mountains, some of these rivers flow long distances through dry regions where not many trees grow. In spring when the rains come and the snows melt, the mountain streams run full, and the rivers carry more water than at other times. The swollen streams wash soil from the banks, and the rushing waters carry it downstream. In the dry lowland country the river overflows its banks and there is a flood. The muddy flood-water spreads out—in some places for miles—and much of it sinks into the ground.

This map shows the location of some other important river valleys. Many years ago men discovered how to farm in the valleys you see on this map and the map on page 132.

The soil from the mountain is left on the land when the flood waters disappear.

Near the eastern end of the Mediterranean are a number of rivers that each year flood the land in their valleys. In the soft, loose soil of these valleys men learned to become farmers many, many centuries ago. The best known of these flooding rivers are the Nile, the Tigris, and the Euphrates. For many thousands of years men have been farming along the banks of these three rivers. In China and in India there are also

great flooding rivers in whose valleys men have been farming for more years than we know.

In the rice country of southeastern Asia, the early farmers had open spaces in the woods and learned to make them larger by cutting down or burning the forest trees so that they could have more room. Rice needs a lot of water, and so these people made their fields where they could get plenty of it. In a forest region there is plenty of water because forests grow only where there is much rainfall.

In many forest regions like those in northern India and in Central America, the early farmers cut rings around the bark of trees with their stone axes. This gradually killed the trees, and when they were dead and dry, the farmers would light fires to burn them up. The fire also burned the bushes and shrubs from the ground. Clearing land this way was hard work, and the fields were small.

The farmers in the clearings and the valleys were able to grow the food they needed for themselves and their families. As time went on, they learned more about the land, about the weather, and about the plants they raised. Many important things were discovered by early farmers.

Making the Floods Work for Man

In the river valleys where floods came every year, farmers found ways to save the flood-water when it came. They let it run into ditches and ponds and then let it flow back on to their land in the dry summertime. This is called irrigating. Men who irrigate must know how to dig their ditches so that water will flow through them. They must know how to survey straight lines.

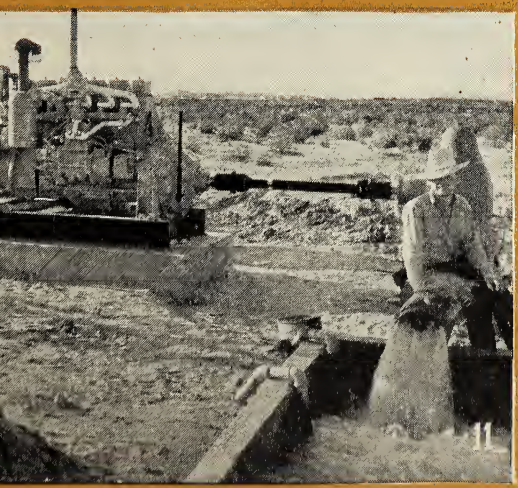
In the valley of the Nile in Egypt the river rose gently each year when water from rains and snow in the mountains, far to the south, filled the river. There was plenty of time for people to get themselves and their animals out of the way of the rising water. But when the flood was past, men had to find their fields again under the rich mud that covered them. And so the Egyptians had another reason for becoming good surveyors. They not only had to be able to build irrigation ditches but also had to find the boundaries of their farms after each flood.

The Tigris and Euphrates rivers were not like the Nile. These streams rose quickly in flood time, without giving any warning. The people who lived in their valley had to know when to expect the flood so that they would not be caught and drowned. They used the knowledge that the old shepherds had about the stars and made very good calendars in order to keep track of the times of the year. They needed this knowledge of the stars (which we call astronomy) for their business of farming in the great valley of the Tigris and Euphrates.

Irrigating, surveying, and astronomy were not the only things that men learned when they became farmers and settled down. They learned to plan ahead in other ways. They learned how to store grain. Probably that is one reason they liked cats so much. They also learned that land grew better crops if it was given a rest now and then or if the kinds of crops were changed each year or two. They learned to select good seeds and the best kind of farm animals, so that the young plants and the young animals would be strong and healthy. Hundreds and hundreds of years passed, for these things were not learned all at once.

The first six pictures show ways of irrigating in different parts of the world. Picture 1 shows a well in Iran. Oxen pull up the buckets, and a boy dumps the water into the ditch. Picture 2 shows a Japanese irrigating his rice fields. Picture 3 shows a man-power water pump in India. Picture 4 shows a big Chinese water wheel. The current moves the wheel and lifts water out of the river. Picture 5 shows rice fields in the Malay Peninsula. Water flows from one terrace to another lower down. Picture 6 shows a big dam across the River Nile. It holds back flood water so there will be some for the fields almost all year.

The pictures on this page show irrigation in the United States. Picture 7 shows ditches in a California orchard. Picture 8 is of a big irrigation dam in Oregon. In Picture 9 you can see a canal that carries water to an orchard and a big field of vegetables. The man in Picture 10 is working on the ditches that carry water to an irrigated field in Colorado. Picture 11 shows an engine pumping water to irrigate some desert land in Arizona. Picture 12 shows men in a tractor preparing land for irrigating. Fields must be almost as flat as a table so the water will flow in all the ditches.



Ideas about Property and Law

PEOPLE not only learned new ways of doing things but new ways of thinking about each other and about the things around them. For example, men got the idea of working together; we call this idea coöperation. They learned to get together to defend their property. And in doing all this they began to have ideas about laws.

Some men who have studied these ancient times say that the farmers in the Nile valley and the valley of the Tigris and Euphrates were the first people to have laws. Farmers in these valleys had to work together in order to dig irrigation ditches and to make big ponds where water could be stored. These jobs were too big for each farmer to do for himself. Besides, all the farmers in the neighborhood would get some benefit from the work. So there had to be some rules about the amount of work each farmer was to do. Then when the ditches and ponds had been dug, there had to be some rules about sharing the water.

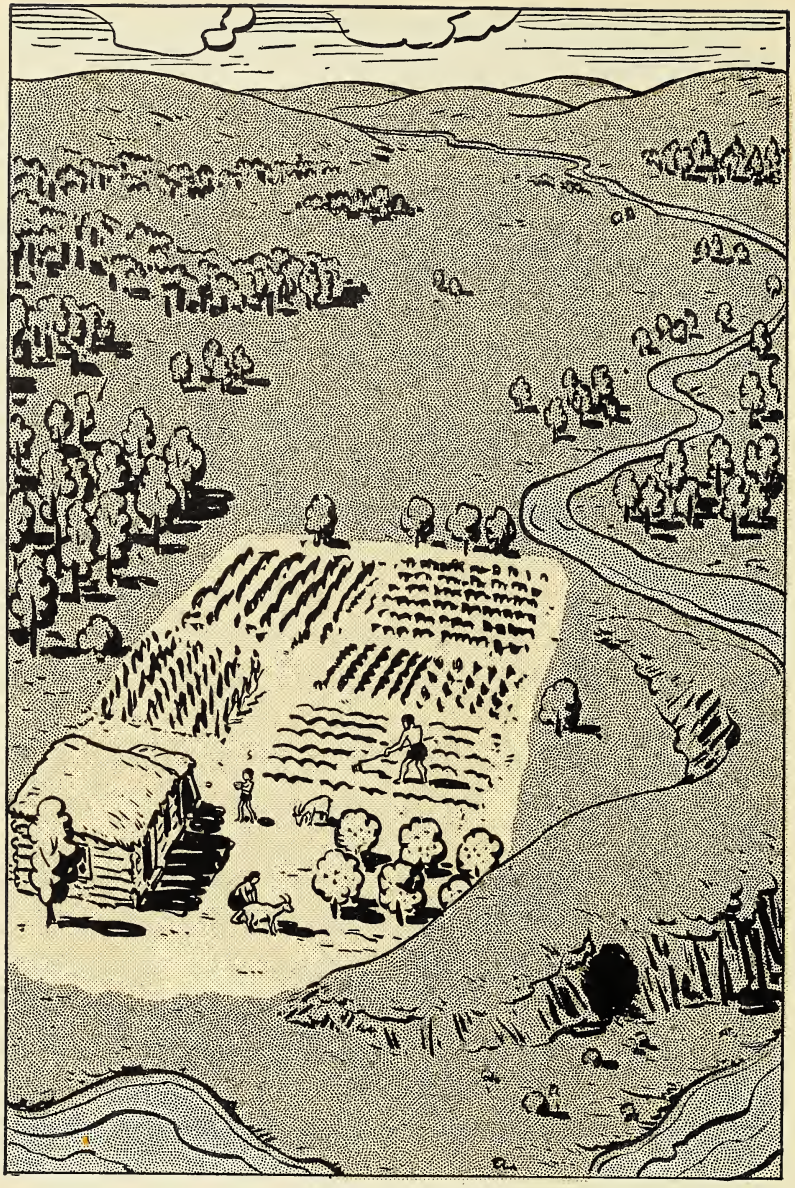
Perhaps some of the rules about using water were the first laws. If you have ever helped to start a club or if you belong to one, you know that rules are necessary when people are going to work or play together.

In other places, in the forest clearings for example, there was also need for laws. There had to be ways to settle disputes between farmers. Among hunters and herdsmen, quarrels did not matter so much. They could settle their troubles by fighting. The loser could move away and perhaps make just as good a living somewhere else. He was used to moving. But farmers were not. They did not like to move. If two men had a dispute, perhaps over the boundary of a field, probably the other neighbors stepped in and helped settle the matter. Gradually people learned to be fair with their neighbors. Certain ways of acting toward other people came to be customs, and the customs came to be laws.

People had to obey customs and laws if they were to live together. When families lived by themselves, they did everything for the good of the family and paid little attention to other people. But when people had neighbors, they had to know how to get along with each other, how to coöperate.

Little by little people were learning how to live together, in communities. Gradually, too, the number of people in the world was increasing. Farming was a way to make the earth support more people.

A hunting family of five might need fifteen square miles of land to hunt over in order to get enough game to live on. A herdsman's family of five might get along with two square miles of land if there were water enough for the grass and for the herd to drink. But a farmer's family of five could live very well on one-



Compare this picture with the ones on pages 53 and 87. The man in this picture supports his family by farming the land. He uses only the land that is not shaded. Compare the amount of land he uses with that used by the herdsman. Or with the amount of land the hunter needed in order to support his family.

eighth of a square mile of land, or even less, if there was plenty of water for his crops. In some places that were especially fertile, like the Nile Valley, six or eight hundred people could make a living on a square mile of rich farm land.

How Farm Villages Grew into Cities

In fertile valleys the small farms were crowded close together. Farmers did not live miles away from each other. They preferred to live together in villages and go out from the villages each day to work on their farms. Living in villages was a sensible thing to do.

When the men were at work on the farms, the women and children were safer together in a village than they would have been on separate farms. People felt safer in the village than they did alone. And so the villages became places where people lived together for safety. But there were other reasons for living in villages. People like to be with other people—that is, almost all people like it. After work was done, the village was a place where friends could meet, talk, and play games. Besides, when a man or a woman had neighbors, the neighbors would help with jobs that were too hard for one person.

Gradually some of these little farm villages grew into towns and then into cities. We can see the same thing happening today. At first all the people in the village were farmers and worked on the land. But one day some boy who did not like farming decided to make his living in another way. Perhaps he could make good clay pots, or strong harness out of leather, or perhaps weave a better basket than anyone else in the village. There must have been farmers who were not skilful at making such things or who were too busy to spend

the time. These people found it easier to trade a measure of grain or some beans for a pot or a harness or a basket than to make them.

Of course a workman could not make his living unless farmers had food to spare. As men became more expert at farming, they had food left over from each crop. This extra food they could trade for things they wanted. They traded this food to people who could do special kinds of work or make special things.

More and more people began to make a living by doing special kinds of work. Workmen did not have to be farmers part of the time and raise their food. They could trade their work, or what they made, for food and other things they needed. Farmers brought their farm produce to the villages where workmen lived. The village became a good place to trade produce for work or to trade one kind of produce for another.

When a village became a good place for trading, more people came there. More farmers came to trade produce, and workmen from other villages came there to live because it was a good place to trade work. In this way some villages grew into towns and then into cities where most of the people traded their work for food or other things.

When people began living together in cities, they needed more rules, or laws, than before. The simple rules of the farmers, that had to do with land and water and animals, did not help the city dwellers who lived differently. The cities came to have many special laws and also special men to see that the laws were obeyed.

As time went on, the workmen who made things became more clever and skilful. Since they did not have to do farm work to get food, they could spend

Crops are good. We can get some things we want.
Farmers once traded their crops for the things they wanted. Today they sell for money and buy the things.
I hope the farmers have good crops and come to trade.
I'm going to trade grain for baskets.
I'd rather farm than make baskets.

their time learning to be better workmen. Some workmen of long ago became expert potters. Some learned to cut and carve stone and to make great buildings. Workmen learned to make ships to sail the seas. And they learned to work in metals, first in the softer gold and copper, later in bronze, then in iron, and then in steel.

With workmen making many different articles, there were now things besides farm produce that could be used for trade. Herdsmen came in from afar with packs on the backs of camels and asses to exchange hides, woolen cloth, and cheese with the men of the farm lands and the cities. On land the drivers of camels and asses went into the business of carrying and trading; on sea the owners of ships did the same. And so the cities by the sea and in the midst of the great farming valleys became busy places of trade.

The cities also became places where people could get an education. In order to carry on business in the cities, men had been obliged to learn to count and to measure, to keep time, and to read and write. A good business man had to know all these things. He had to learn them somewhere and was likely to find teachers in the city. Because of all these things, the cities became very important.

What Keeps the Cities Going

Cities were so large and important that people sometimes forgot how important farms and farmers were. Today, too, people sometimes forget that it is really the farmers who keep cities going. Farmers must raise more food than they need for themselves and their families. They must raise enough to feed the people in towns and cities. If they did not do that,

Men who owned camels or donkeys that were trained to carry or haul loads were the first ones to go into the transportation business. Their animals could haul so much more than men could carry alone.

city people would starve. The farmers of long, long ago had to do that just as the farmers of today must.

Even in those days, many people thought that the cities were better places to live in than the country. More and more men who owned farms came to the cities to live and had other men take care of their land. They even began to look down upon the men who stayed in the country. Rich city men often bought many farms and used slaves to do the work on the land.

Men who were hired to take care of farms wanted to get big crops from the land. Wearing out the soil did not matter to them because they did not own the land.

Each year the land that was being worn out produced smaller crops. Another reason why the land produced smaller crops was that slaves were doing much of the farm work. The slaves did not do their work as well as free men. They were not interested because they did not get a share of the good crops. They got just enough to eat and just enough clothes no matter how large the crops were.

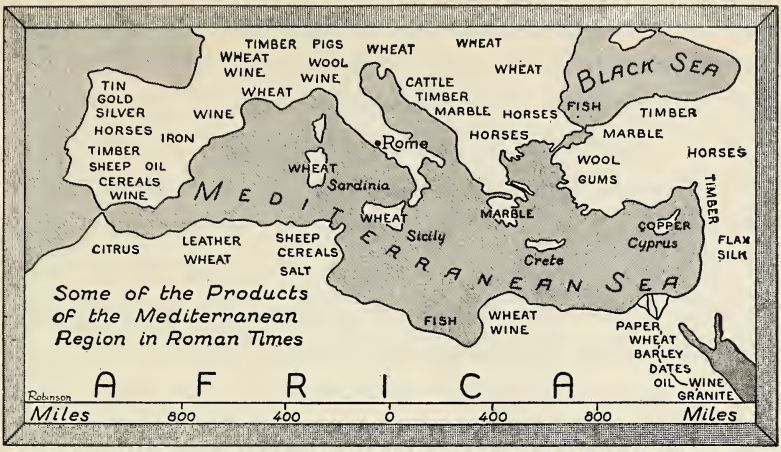
All this was not good for the land, and it was not good for the people who lived in the country. It was not good for the people in the cities, either. They had to have more and more food shipped in from far away. It is a dangerous thing for great cities to have to ship in much food from long distances, especially from over the seas, because enemies can seize the ships. And then the people of the cities go hungry! This has happened not once but many times. It happened to Rome, once the greatest city in the world.

Farmers Helped to Make Rome a Great City

When Jesus was living, Rome was the greatest city in the world. It had grown from a little trading village into a city filled with splendid temples and other fine buildings. It also had slums where thousands and thousands of poor people lived.

The Roman people had been farmers and herdsmen when Rome was a village. In time they learned much from the people of Greece, from the Egyptians, from the people who lived along the Tigris and Euphrates rivers—from all the people who lived along the shores of the Mediterranean Sea.

One by one the peoples who lived around the Mediterranean had been fought and conquered by the



You might make a map of the region where you live and show on it some of the products that come from that region. Turn to page 177 and read about ways to make such a map.

Romans. The Romans needed more and more land and more and more food to supply their city. The Romans also sent their soldiers into the great forest regions that are now France, Germany, and England. They encouraged hunters and herdsmen to settle down and then taught those who were farmers to farm the Roman way.

Before the Romans came into the wooded country of western Europe, the people lived in villages and towns. A great deal of the land was used as pasture ground or as hunting ground by all the people. Such land belonged to everyone, not to one person or to just a few. Anyone in the tribe could hunt on this land, called common land; anyone could pasture his cattle on the common land. In some tribes farmers owned their land. In some tribes there were rich nobles who owned most of the land and had many slaves.

After the Romans conquered western Europe, the common land was divided into great farms, or estates.

In time these great estates were owned by rich men who allowed people to use the land, if they paid something for using it. Farmers had no money, so they paid in crops, such as grain, or animals, or by doing work. You could call the payment rent, or you could call it taxes. Soldiers protected the people who paid to use the land, and soldiers saw that laws were obeyed. They were like policemen. The soldiers also made sure that rents and taxes were paid.

Farmers in the Middle Ages

A TIME came when there were no Roman soldiers to protect the land around the Mediterranean and the forested lands of western Europe. There were no soldiers to keep watch in the towns and along the roads. Bandits and raiding tribesmen roamed about, taking what they wanted. They stole the farmers' crops, drove off the animals, and plundered the homes. People who worked on the land had no protection against these raiders.

The rich men, called lords, who owned the big estates, had to have their own soldiers in order to protect their land and their property. The lord's soldiers protected the farmers who lived on the lord's land, and the farmers were glad to work in places where they could be protected.

Sometimes a family of farming people would keep the same piece of ground, year after year, paying rent to the lord and working for him a part of the time. When a farmer died, his son stayed on the same land and went on paying the lord and working for him, just as his father had done.

Sometimes families would take turns farming different pieces of land near their village. Many villages

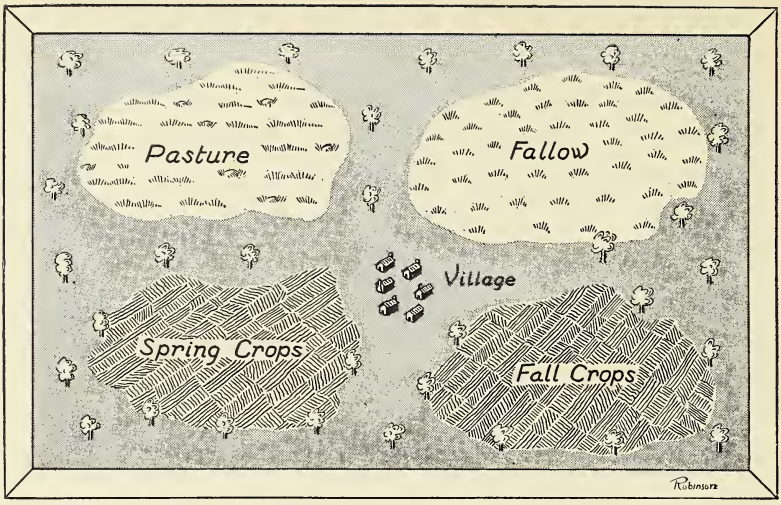
still had the commons, or community land, for pasture and for wood, but the lords did not allow the people to hunt and add to their scanty food supply. Only the lord and the lord's friends could go hunting.

Although there was common land on almost all big estates, the lords did not let the people think of this land as their own. The farmers were reminded, every time they paid for using the land, that it belonged to the lord. They stayed because they were afraid to move away to a strange place. After a time they were obliged to stay on the land where they lived. They were not allowed to leave. They had to work for the lord and to fight for him, and so the lord began to think that the workers on the land belonged to him just as the land itself did. The workers were called serfs.

Many large estates belonged to churches, and thousands of serfs worked on them. Some of these estates were farmed very well, because the monks and priests who ran them had studied the old Roman methods of farming. But most of the land belonging to the great lords was not farmed carefully. Although they farmed badly, some of these lords became rich while their serfs were very poor.

When great lords fought among themselves—as often they did—it was always the people who suffered most in war. They paid larger rents, and heavy taxes were collected from them in order to pay for the wars. People pay for wars today in the same ways.

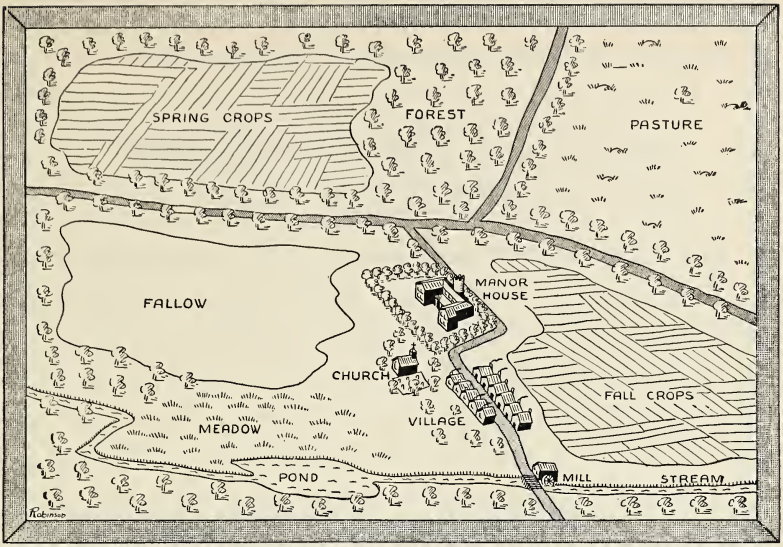
But there were some good things about life on the great estates during the time that is called the Middle Ages. Many of the lords were fair and just and brave in protecting their people. They did their best to see that the farmers could work the land in peace.



In the Middle Ages the farmers of a village divided their land into four groups of fields. One group was planted in the fall, another in the spring. One group was used for pasture, and another was plowed but not seeded. This land stayed idle for a year and was called "fallow" land. The next year the fallow land would be planted with fall crops, and the fall crop land would be planted with spring crops. The spring crop land would be plowed and left fallow for a whole year. The farmers generally kept the same land for pasture.

The people who farmed had to depend almost entirely on what they could produce themselves. They lived on the land, the land fed them, and they learned to love and care for it. One thing in particular they learned about the land: they knew that land on which the same crop was grown, year after year, became worn out. They grew different crops in different years on the same fields, and they let the land lie at rest or put it into pasture every few years. They also learned that if they did not put something back on the land in the form of fertilizer of some kind, the land became poor.

The people of the Middle Ages did not understand all the reasons for doing these things, but some farmers



This map shows how many of the villages and manors must have looked in the Middle Ages. Each serf had fields in the sections where fall crops were planted, where spring crops were planted, and where the land was lying fallow. The fields were long and narrow. The pasture land was not divided but was for the use of all. And all could gather wood in the forest. Only the landowner could hunt.

knew enough to do them. They worked out plans for using the land. You can see the plan of an estate in the picture. There are woodlands for timber, firewood, and game. There is land for pastures, gardens, and fields. Also shown are the village and the home, called a manor house, of the lord who owned the land.

If the lord was very powerful and rich, he would probably have several estates and a manor on each estate. Somewhere, on one of his estates he would have a strong castle, or fortress, in which he could live in time of war. A lord with several houses or castles might take his family, his friends, his soldiers, and his servants with him and stay at one of his manors until he had used up whatever was stored there for him.

Then he would move on with all his people except, of course, the serfs, to another of his estates.

Self-Supporting Communities of the Middle Ages

On such a big estate there was need for workmen as well as for farmers, and every man and woman had certain duties to perform. All the grain that was raised was ground in a mill on the estate, so there was a miller. The lord had a bakery with a big oven and a baker to run it. The people paid for having their grain ground in the lord's mill and their bread baked in the lord's bakery. There were men to shoe the horses and blacksmiths to make tools and repair them.

On a big estate men were needed to cut down trees, build and repair houses, make carts, and do all kinds of carpenter work. If sheep were raised, spinners were needed to make yarn. Usually that was work for women and girls. Weavers were also needed to make the yarn into cloth and tailors to make the cloth into clothes.

Many of the workmen on the big estates lived in villages where they had their gardens, their cows, chickens, pigs, and even small fields. In their spare time they grew a great deal of the food they needed. But their regular work was making the things wanted by people on the estate.

Throughout most of western Europe in the Middle Ages there were little communities like the one that has just been described. In each of them, farmers raised the food and workmen made the things the community needed. The farmers and the workmen not

only had to make their living, but they had to raise food and make things for the lord, for his family, his servants, and his soldiers. So it was the farmers and the workmen who supported the others.

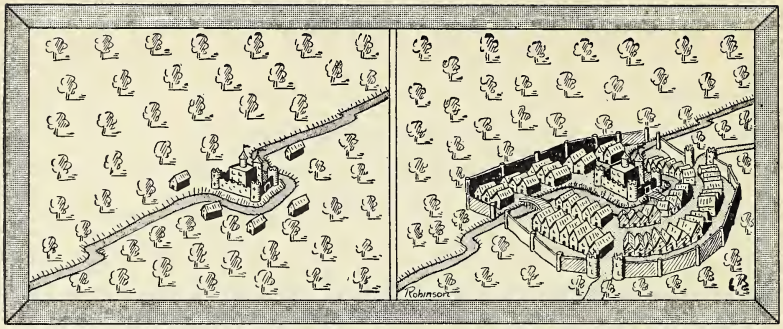
We say that such communities are self-supporting. They did not usually need to get anything from outside the estate. Perhaps they had to buy a little iron from time to time. And most of them had to buy salt. But if the estate was near the sea, they could even make their own salt. The lord sent away for some of his fine clothes, such as silks, and sometimes for special kinds of food, such as spices. Spices were used for flavor, particularly to change the taste of meat that had been kept too long. There was no refrigeration then.

How Trade Began Again

Sometimes peddlers came to the castles of the lords and to the villages of the working people. They traded knives and cloth to the workers and silks and spices and goods from far-off lands to the lord and the members of his household. In exchange they took things that the farmers had raised for the lord or things the workmen had made for the lord—such as wool or cloth, flour, or leather goods. These things the peddlers would then take to some other part of the country where the people did not have enough of such things.

Now something happened in this western part of Europe that had happened, ages before, in the valleys where men first learned to farm. Some of the villages became good places to trade, and when more and more traders came, they grew into cities.

In the early Middle Ages there had been only a few cities in the regions that are now France, Germany,



These two small drawings show how a town sometimes grew around a manor house or castle. In the first picture you see a few houses that free men, such as traders or skilled workmen, built close to the manor house so that they could have the lord's protection. In the second picture you see what happened after the men got permission to put a wall around their homes. The place inside the wall became an especially safe place to live, and people moved there.

and Great Britain. But many small communities were growing into cities. Workmen left the estates of the lords and came to the cities to live because they thought they could make a better living there. The cities became places where goods were made and sold. We sometimes call such cities "centers of trade." Cities where spinners and weavers and dyers worked became famous for cloth. Other cities became famous for other things, such as glassware, silverware and jewelry, leather goods, or knives.

Several important changes took place while cities were growing up in Europe. The first was that people on the big estates and farms began living in a different way. Country communities no longer made and raised all they needed. Perhaps people in one community spent their time raising sheep and traded wool in the city for carts, shoes, tools, and other needed articles instead of spending part of their time in making these things at home. People on farms found

that workmen in cities could pay for food and other materials that were raised on the farms.

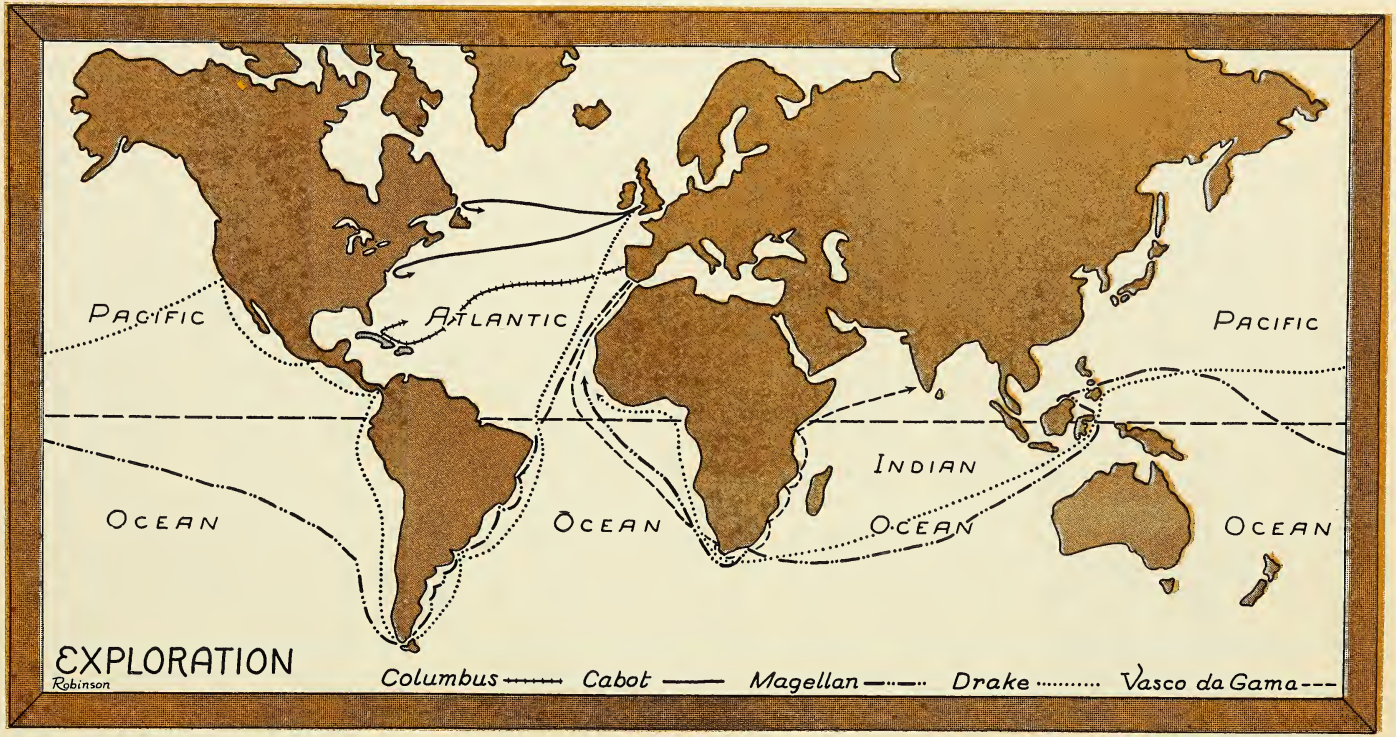
A second important thing that happened was that people found many new ways to make a living. The workmen in the cities not only used food and materials produced on farms, but they also needed clay and iron and many other materials in order to make the things people were wanting. And so there were jobs for other workmen—cutting down trees, mining iron, digging clay, and doing many other tasks to produce the many kinds of materials that workers in the city could turn into goods.

A third important happening was that traders discovered they could sell many things that people had not wanted before. More people began to want such things as sugar, rugs, silks, and products that came from a different part of the world. Men went into the business of buying and selling these products. Some used pack-animals and carts to carry the goods; others used ships. Many people had jobs just transporting goods that traders bought in one part of the world and sold in another.

Discovering New Lands

TRADERS and men with ships kept looking for new places where they could sell goods and get products to sell somewhere else. Sailors and explorers looked for new ways to reach far-away places, and many new lands were discovered. At least they were new to the people of Europe.

America was one of the places discovered by the people of Europe. People from different countries of Europe sailed to North America and to South America. Some came looking for gold and silver; others wanted



This map shows some of the most celebrated voyages of exploration made by sailors from Western Europe.

to settle down and farm. The Spaniards tried mining, fruit-farming, and cattle-raising, for they knew how to do those things at home. Frenchmen tried fishing, sheep-raising, and farming—things they had done at home. Englishmen came to North America and started farms and small workshops and tried to have them like those of England.

Colonial Farms in America

THE FARMS of the colonists in America could not be just like the farms in Europe. In New England the farmers soon found that maize or Indian corn grew better than English wheat. Corn was a new grain to the settlers, and they had to learn from the Indians how to grow it. A family with a small farm could raise corn and vegetables and some animals for food. To get manufactured things from England, the colonists cut timber, raised horses, trapped furs, and burned wood to make lye for soap-making. All these products they sent to England to be sold.

In Virginia, though, the land was different from that in New England, and the climate also was different. The settlers in Virginia found that they could easily grow tobacco. This was another plant that the settlers learned about from the Indians. Tobacco could be easily sold in England, and so the Virginia farmers began to raise it in large quantities.

Many of the Virginia farms became large estates. The owner of such an estate, called a plantation, would usually have a fine big house and would own many slaves to work the land and to make things needed on the plantation. In this way the plantations were very much like the great estates of the lords in Europe during the Middle Ages.

George Washington's plantation at Mount Vernon was such an estate. Many of his friends had estates as large as or larger than the one at Mount Vernon. Each plantation could produce almost everything the owner needed for himself and his family and his working people. And it also produced a great deal that could be shipped away and be sold.

Although Washington was a good farmer, many of his friends were not, and they took crops off the land without putting back any fertilizer. Year after year, they grew the same crop, and this wore out the land. Often the owners of plantations had to look for new land to farm and rented their old, worn-out farms to people who couldn't afford to rent better places.

In New England and the rest of the North most of the farms were small. They were owned by the families who worked and lived on them. Sometimes the farms were well cared for, sometimes not. And because these farms were small, they could not comfortably support more than one family. Some of the sons and daughters in a family had to move away when they grew up, in order to make a living. Many of them moved to new farms farther west; others moved into the towns and became workers in mills and factories.

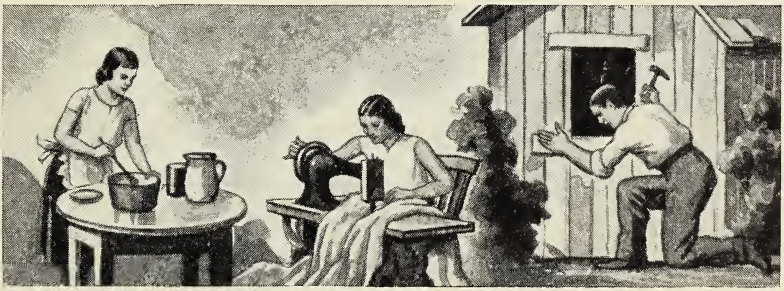
Those who stayed behind on the farms tried to raise as much to sell as they could. If the farmers made enough money to leave the farms and live in town, they often sold their farms, or rented them to tenants, or hired people to run them.

Plans for Using the Land

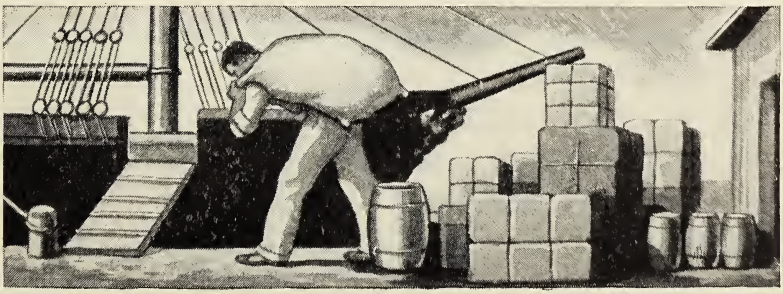
In both the North and the South, much of the land of America has not been so well cared for as the land of western Europe. Today we know that this is

Men work on plantations and farms raising different kinds of crops.

When the crops are harvested, there is a supply of materials.



Some of these are used there for food, clothing, and shelter.



But there should be something left over to sell or to trade.

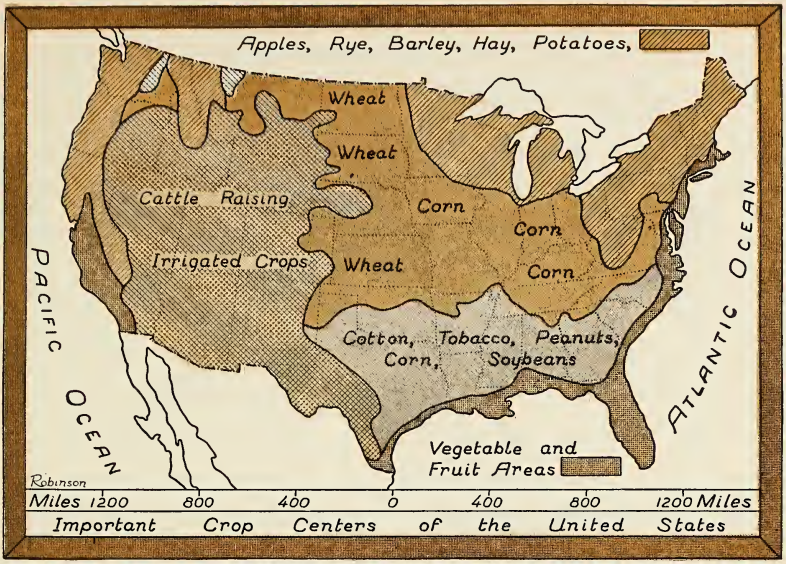
true and are trying hard to put our farm land back into good condition. We should work out careful plans for using the land and for managing farm work.

Good plans for the use of the land are most important. There are good and bad plans, even for so simple a thing as a back yard. There is the best place for the drive, the garage, the clothesline, lawn, flower and vegetable gardens. Perhaps you have seen magazines with plans that show good ways to use the space in a yard.

There are good and bad plans for using the farm land of this country of ours. No one has ever sat down to make a plan for the whole of our country, but we do have a great deal of information that would help in making a good plan. For instance, the farmers in different parts of the country have tried growing one thing and then another, and we know what crops have been successful.

Of course, to have a successful crop, the farmer must do more than raise the crop and harvest it; he must also sell it. It would do a farmer no good to raise a large crop of spinach if no one wanted to buy spinach. And so farmers depend not only on farms where the soil and climate are right but also on the places—mostly towns and cities—where there are people who want to buy their crops.

One way to get an idea of how a good plan for farmers in this country could be made is to look at the map on page 161. On this map are places called crop centers. Around these centers the farmers raise mostly the same crops. For example, there is the Northeastern Center, where the crops are chiefly apples, potatoes, rye, barley, and hay. Then there is the Southeastern Center, where the crops are chiefly cotton, tobacco,

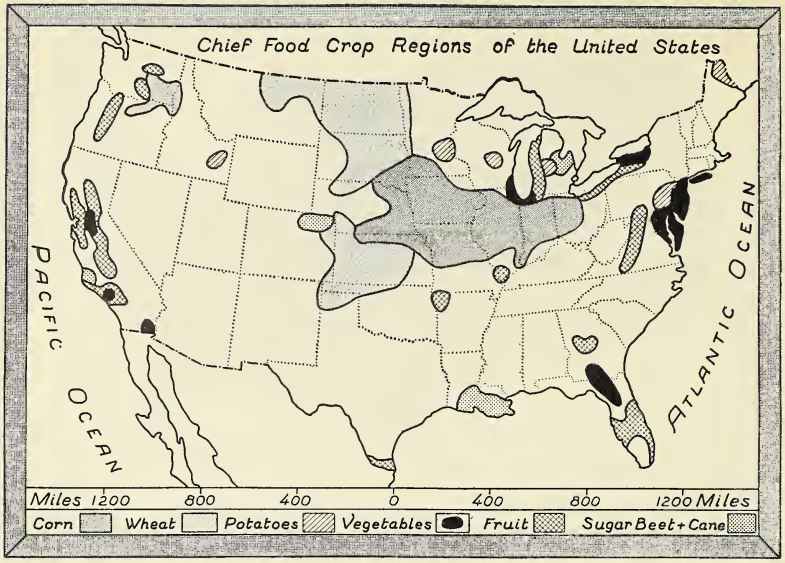


This map shows the crop centers of the United States. Of course, sometimes farmers in a region grow crops other than the ones shown on this map. The map shows only the most important crops.

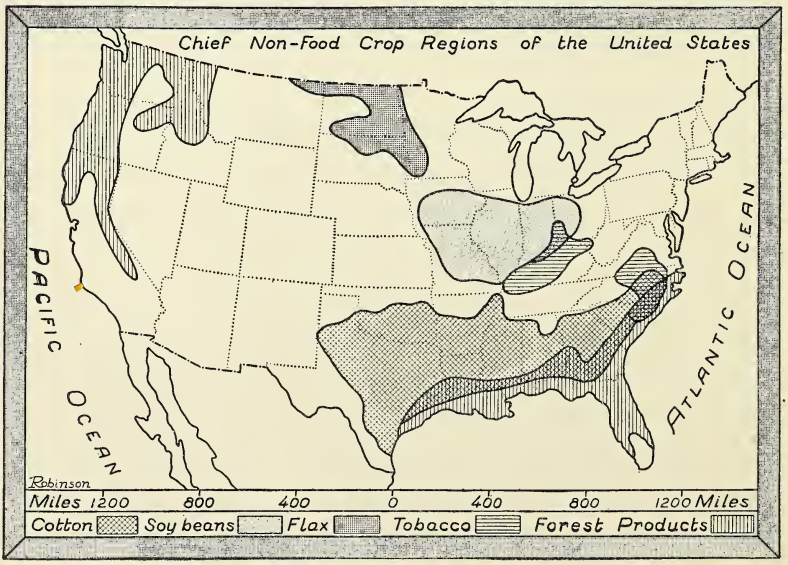
peanuts, corn, and soy beans. Study the other crop centers shown on the map.

There are also crop centers in other parts of the world. The maps on this page and the next show some of the important crop centers on the different continents.

In each region shown on these maps you will find two kinds of crops. The first kind is used by the people of that region. Crops of this kind are usually food. The other kind of crop is sent away, sometimes to another part of the world. For example, people in parts of Central America and India raise much more fiber for making ropes and bags than they could use themselves. Our southern states raise much more cotton than the people there can use. Such crops are sent to places where the materials are needed and cannot be raised.



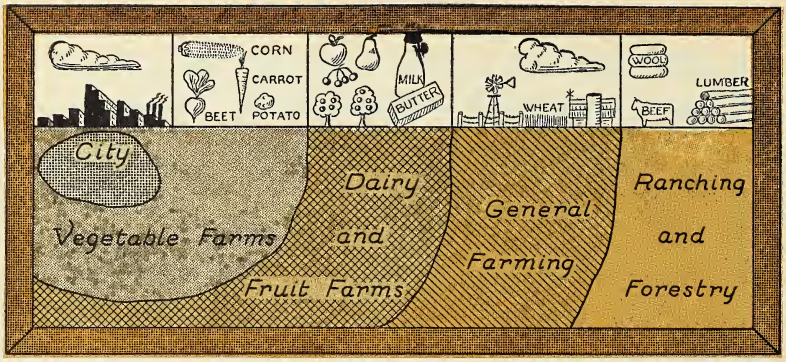
The map above shows the most important crops used for food, while the map below shows important crops that are not used for food. Find your region on both maps. Also find it on the map on page 161. What kinds of crops are shown for your region on these maps? What kinds of crops would you see growing or being harvested if you made an automobile trip to different places in the region?



Many of the crops that are sent away are particularly interesting to study. The rubber we use comes from the sap of trees grown in tropical lands. Once all such trees grew wild, but now most of them are carefully planted and tended in great plantations. Coffee once came from a wild shrub, but raising it is now a big business in certain tropical countries. Oily nuts, useful in soap-making, come from jungles and other parts of the tropics. Fine woods for making furniture are sent us from the hot, rainy forests of the tropics. And there are many other crops that grow in distant parts of the world that are very useful to us.

In reading books about various communities, perhaps you have noticed that there are ways in which communities are alike and ways in which they are unlike. Possibly you have noticed differences between your own community and places you have visited. This is also true about whole regions. One part of the country may be unlike another part because the crops may be different, the climate may be different, or the soil may be different. But there is one way in which most regions are alike. Whatever the crops may be in any crop center, you will find beyond the cities a belt of small gardens, and fruit and chicken farms. Dairy farms will be a little farther away, and farms that raise grain or livestock farthest away from the cities. The small farms close to the city produce much of the fresh food that city people eat. For that reason the farms must be near the markets.

Farm regions are alike in another way. The farmers use the land for growing crops if possible. But if the land will not grow crops profitably, it may be used for pasture. And if it is not suitable for pasture, trees should be allowed to grow up if trees will grow there.



This drawing is a diagram of what you have just read. In what part of this diagram would you put your own community?

Saving the Soil with Pastures and Forests

FARMERS sometimes plant too much land and grow more crops than can be sold. Sometimes they work hard to grow a poor crop on land that ought to be used for another purpose. The government is trying to get American farmers to have more pasture land and forest. We do not have enough pasture land, and wood is getting scarcer. Rough, hilly land is usually better for trees than for any other crop.

Having more pasture land and more forests will help to save the soil on many farms. Soil is something that takes a long time to make. It is rock that has been broken up and changed by weather, plants, and animals. Only the upper layers of soil in which plants and animals have lived is really good soil for growing crops.

As long as trees or grass cover the ground, the soil will stay in place. The grass and tree roots help to hold it in place. You can prove this by handling a piece of sod. The roots hold the dirt. When soil stays in place, the plants and tiny animals that live in

Can you find a place like this near your school? In such a place it is easy to study the soil and find out many things about it. With the help of your science teacher you might make a display that would show the different kinds of soil near your school. The different kinds can be put into bottles and labeled. The labels ought to show how each kind of soil is being used.

the soil, as well as water, frost, and sunshine, keep on doing their work to make the soil rich and fertile. But when the trees are cut down or the grass is plowed up to make room for crops, it is hard to keep the rich topsoil from blowing away or washing away. When the soil blows or washes away, even a very little at a time, the land is being ruined for farming.

Men know ways to keep soil from washing or blowing away, even when the land is sown with crops. There are ways to plow the ground so that rain will soak in instead of running off and carrying soil with it. There are special kinds of crops that can be planted. These growing plants will help to hold the soil together and keep it from being blown or washed away. And men are finding other ways that will help

Picture 1 shows a dust storm in the western part of the United States. Picture 2 shows a farm after several days of such storms.

Picture 4 shows a farm where the topsoil is beginning to wash away. Pictures 3 and 5 show ways to prevent this. Special crops are planted.

to keep the rich topsoil where it belongs. All these ways are called soil conservation.

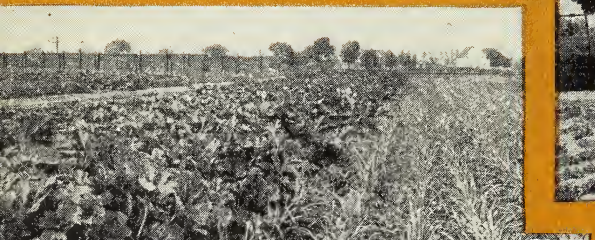
Soil is not the same in every part of the country. In one part of the United States you may see farms with black soil. In another part of the United States the soil may be gray or yellow. And in many places it is brick red. In some places the soil is sandy; in others it is gravelly or rocky. The color of the soil does not always show how rich it may be; it may only show the kind of rocks from which the soil came.

Crops That Suit the Climate

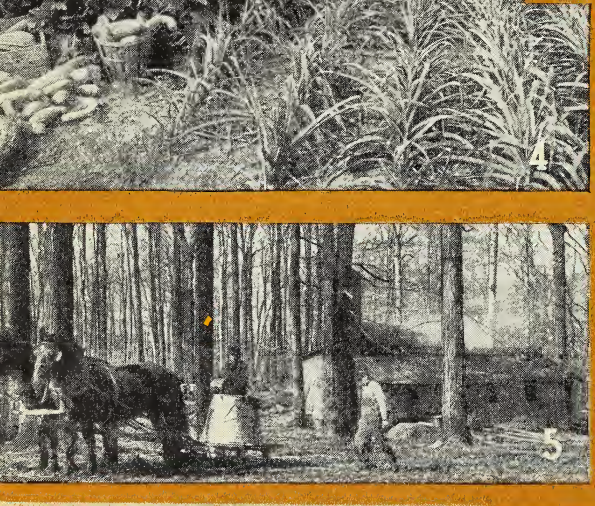
EACH of these different soils is particularly good for raising certain crops. But farmers must plan on raising not only crops that suit the soil but also crops that suit the climate. If spring comes very late in a region and the first frosts of autumn come early, we say that the region has a short growing season. The farmer in that region must select crops that grow rapidly and can be harvested quite early. For example, oats take twelve weeks to ripen and so can be grown in places where the growing season is short. Where spring comes early and fall is late, there is a long growing season and farmers can select plants that take longer to grow. Cotton, for example, may take as long as twenty weeks to ripen. It could not be grown in places where the growing season was very short because frost might kill the plants.

Some kinds of plants need lots of rain and sunshine, while others can get along with much less. For example, corn needs warm weather to grow well, but rye will grow in regions where it is cool. Cotton needs warm weather, but flax will grow in cool places. Fruit trees need lots of moisture, but alfalfa and broom corn

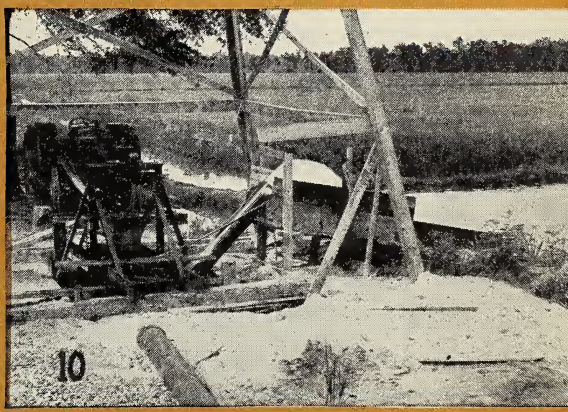
Picture 1 was taken in a pecan grove. The men are spraying the trees. Picture 2 shows a fruit orchard. In a row between the trees you can see the smudge pots which are lighted when the owner of the orchard is afraid of frost.



Picture 3 was taken on a smal peanut farm. Picture 4 shows a vegetable farm close to a big city Onions, spinach, and squash are grown on this farm. Picture 5 was taken on a farm where there were a lot of sugar maples. The men are collecting the sap in order to make maple syrup and maple sugar. Picture 6 shows men shoveling sugar beets into trucks that will carry them from the field to the refinery.



All the pictures on these two pages are of crops that are used for food. On pages 174 and 175 are pictures of crops that are not used for food.



In picture 7 workers are picking a crop of strawberries. The man in Picture 8 is plowing a field with a tractor. In the next field you can see shocks of corn that have been harvested. Picture 9 shows sugar cane growing. Picture 10 is a rice field in the United States. Picture 11 was taken on a great wheat farm in a western state. Picture 12 shows a ranch where melons are grown. The pickers are at work.

In an encyclopedia or in other books find where these crops are grown. Make a map and on it mark places where these pictures might have been taken.

will grow where the climate is much drier. You can surely see that climate has a great deal to do with the kind of crops that are selected.

Different Kinds of Crops

WHEN we speak of farmers' crops, we usually think of foods, perhaps because we are reminded of food many times a day. Many millions of acres of land throughout the world are used for producing foods. The farms close to cities do not produce all the foods the people in the cities eat. They do not even produce all the vegetables, fruits, poultry, and dairy foods that are needed every day in cities. Some of this food must come from farther away. For example, fruits and vegetables from California, Florida, and other states are shipped in fast refrigerator cars to cities hundreds of miles away. Wheat from farms in the Missouri River valley is ground into flour, and the flour is shipped to cities and towns all over our country. And there are many other food crops that are sent to markets far away from the farms where they were raised.

But there are many other crops besides foods that are important. In some parts of the country the chief crops cannot be eaten. Some are crops raised to be woven into cloth of many kinds. There are flax, cotton, wool, and even wood for making rayon. Soybeans are being planted by more and more farmers each year, because the oil in the soybean is useful in manufacturing. Very little of the soybean goes to waste, because what is left after the oil is pressed out can also be used. Perhaps the steering wheel on your father's automobile is made of pulp from soybeans. About half of the soybeans grown are used for making food products.

Tobacco is another crop that is not a food crop. Many thousands of acres of land are used for growing different kinds of tobacco.

Trees are another crop that is not eaten. We are coming to think more about our trees than we ever did before. Once people cut down the forests without ever thinking about what would happen when the trees were gone. Now we know that trees are necessary, not just because their wood is useful but also because living trees help to keep the soil in place. People are beginning to understand that trees can also be a good crop to raise. They grow much slower than other crops, and farmers must wait longer to harvest them, but experts know that trees often pay when raised as a crop.

We use trees and their products in many ways. Besides fruit and nut trees, there are some trees that produce what we call forest products. In the southern states, from Georgia to Texas, the long-leafed pine is valuable because it produces rosin and turpentine. Another tree that is sometimes planted in a few southern states bears nuts from which tung oil is pressed. This oil is useful in making paint. In the northeastern states, maple sap is gathered and cooked to make maple syrup or sugar. Trees are grown for making rayon and for wood pulp from which paper is made And of course lumber is the most important forest product of all.

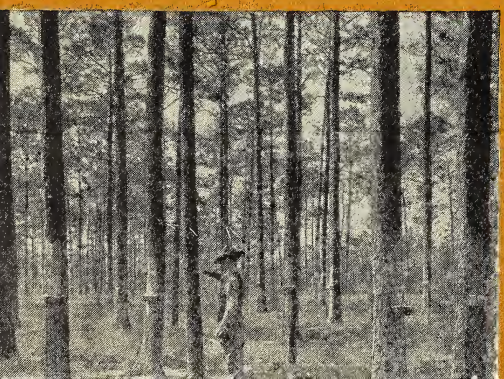
After you look at the maps of the different crops that are raised in the United States, turn to the maps on pages 28 and 29 and look again at the regions which produce these crops. Notice whether the region is a warm or a cool one, a wet or a dry one. Comparing the maps will help you to understand that climate

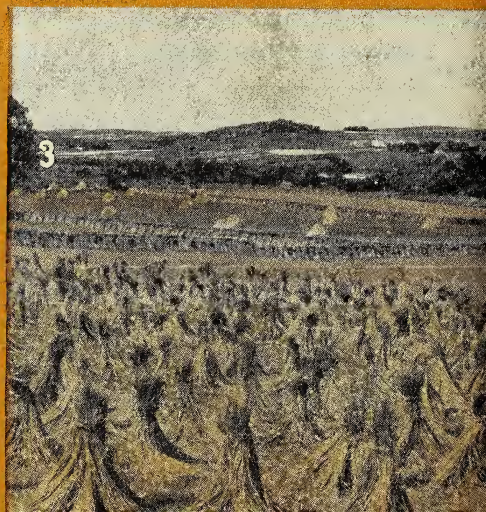
The pictures on these two pages show crops that are not used for food. Picture 1 shows an enormous number of logs in a river. People are now thinking of trees as a crop that takes a long time to grow. Picture 2 shows a field of hemp that has been harvested, while Picture 3 shows a field of flax. Picture 4 was taken in a forest where the trees furnish a crop of sap that is used to make turpentine.

1

2

Picture 5 on the opposite page was taken in a southern cotton field. In Picture 6 the man with a tractor is harvesting soybeans. They are also used for food. Picture 7 shows sisal, a fiber used to make rope and twine. Picture 8 shows tung nuts. Picture 9 shows tobacco drying in a barn. Can you think of other crops that are not used for food?

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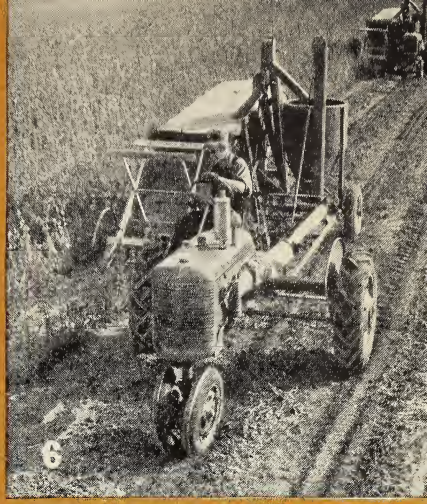

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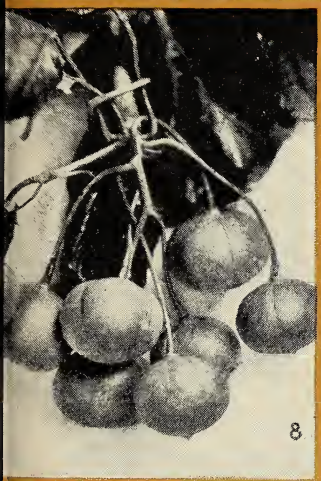
Below: Tung nuts are of different sizes. Each husk contains several.



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Make a list of crops that are not used for food. Then make another list of ways in which these materials are used. You could write wood for furniture, flax for tablecloths, and so on. Make a crop map and show on it where these pictures and others you collected might have been taken.

is very important. It is really climate that decides what kinds of plants and how large crops men can raise on the land.

Your Region and Its Useful Plants

At the end of each chapter you have read so far there have been suggestions about things you could do to make your study more interesting. Scattered through each chapter, especially under pictures and maps, have been other suggestions. Some of these have been:

1. Making lists and studying them.
2. Collecting pictures.
3. Making maps.
4. Reading stories and poems.
5. Preparing collections and exhibits.
6. Drawing pictures and cartoons.
7. Making trips.
8. Talking to people who know.

You can do every one of these things to make your study of plant resources interesting. Look over the eight suggestions listed above and discuss them in class. Decide on the things you think would be interesting to do in studying plant resources.

If you make a map, you can use symbols such as the following:

Forests

Grain

Apples or other Fruit

You could easily make up other symbols for vegetables, and other crops. The information about crops in your region, which you get from reading books, from encyclopedias, from your County Agent, and from other places, can be put on your map by using these symbols.

If some of the pupils in the class decide to collect pictures, they might try to find pictures of farms that are losing their soil. You can find such pictures in magazines, in newspapers, and in some books. Look for articles on *Erosion* and *Conservation*. Some of the companies that make farm machinery have booklets that show pictures of such farms and pictures of what can be done to save the farms. There are government booklets that show the same kind of pictures.

The tools used in farming are important. Perhaps some of the pupils would like to make a report on farming tools and machinery. They can interview old settlers in the region, perhaps visit a museum, and collect pictures from old catalogs and newspapers. It would be interesting to show the class how some of the tools have been improved. The class might ask such questions as: "How long did it take to harvest an acre of grain fifty years ago?" "How long does it take to harvest an acre of grain today?" "Can farmers plant their fields as quickly now as they could a hundred years ago?"

A good way to show some of the differences between farming today and farming many years ago would be to collect prints of pictures by Jean François Millet, a French artist who lived during the last century. Compare his pictures of French farmers at work with prints of pictures by Grant Wood, a modern American artist.

In this chapter you have read about how the topsoil in our country is being destroyed because forests have been cut down and prairies plowed up. It would be interesting and worth-while for you to find out what is happening to the topsoil in your home region.

If you live in the country or a small town, it would be easy to take a field trip. You might appoint members of your class to scout out places where the topsoil is being

blown or washed away and to decide which would be the best and most convenient place for the class to visit.

Before you go on the trip, try to find out what the land was like before the first settlers came in. Was it covered with forests or with grass? What happened to the forests? What happened to the grass? If forests and grass were destroyed, try to learn why. The librarian in your local library may be able to help you find material about these things. You might also talk with some old person who has lived all his life in the region.

It would be a good idea for each one of you to take a small notebook and pencil with you on the trip. Then you can jot down any items of interest you may see and not run the risk of forgetting them.

There are a number of important things for you to observe and think about on the trip. Is the land level or sloping? What has the slope of the land to do with the washing away of the soil? Does the rain water run into a stream? Are there ever floods in this stream? Have gullies been formed? If you don't know what a gully is, look it up in the dictionary. How thick is the topsoil now? How far down would the roots of plants have to grow to reach ground-water level?

Write a report on what you observed on the field trip. Be sure to tell the reasons for the conditions you found and to explain what you think might be done to remedy them. Read your reports in class and discuss them. Maybe you can find someone who knows about soil conservation and ask him to talk to the class.

If you live in a large town or in the city, it may not be easy to plan a field trip into the country. But the class can visit a nearby park. What you will observe will be probably just the opposite of what the children who went on the field trip into the country observed.

You will see how grass and trees help keep the soil in place and hold the moisture. Take notebook and pencil along and make notes of the things you observe. Notice the thickness of the grass and the length of the roots. Notice the height and size of the trees, the width of the branches, and the thickness of the leaves. How do the leaves and branches help protect the soil in a hard downpour? Notice the roots of the trees. How do they help in keeping the soil from washing and blowing away? What happens to the rain that sinks down into the soil? How will it help the soil in time of drought? Maybe there is a playground in the park where the grass has been worn away by running feet. Why wouldn't you like to play there on a very windy day? What happens to the surface of the playground when it rains?

Make a report on your trip, telling what you have seen and explaining how the grass and the trees help conserve the soil.

Some of you might like to prepare a story to tell your classmates on one of the following subjects:

1. The story of a drop of rain that fell in the forest.
2. The story of a drop of rain that fell on land where the surface covering had been destroyed.

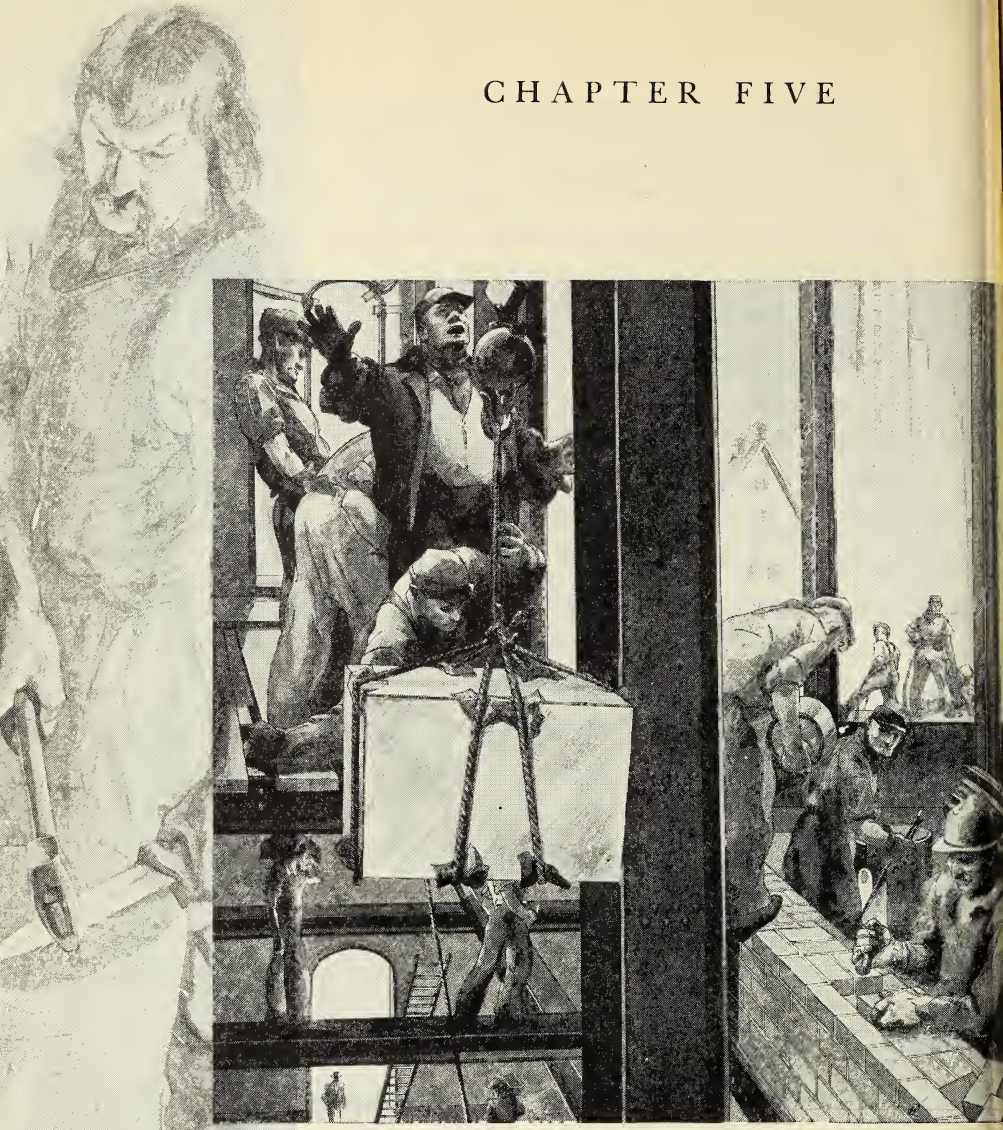
You might start out the first story this way:

One day a drop of rain fell from the clouds. It fell into a large oak forest.

Here are some of the most important words to add to your glossary. Have you looked them up in the dictionary?

harvest	till	topsoil
fertile	exchange	conservation
clearing	climate	plantation
irrigation	estate	crop
law	produce	region

CHAPTER FIVE



THE DIGGER

Today we use minerals in hundreds and hundreds of different ways.

Learning to Use Minerals

THE HUNTER, the herdsman, and the farmer of long ago each worked in his own way to get animals and plants so that he could live. But each one, in his own way, was also a maker of things. He made clothing and tents from skins and the hair of animals, bows and arrows from wood, sharp tools from the bones of animals, and also rope, nets, and cloth from plant fibers twisted together. These are only a few of the things that can be made from materials we find around us, from useful plants and animals.

But the early hunter, herdsman, and farmer also used other materials. For example, they used stone. Stone is heavy and hard and can be used for pounding. Probably you have often looked for a stone to use for pounding or to pound on. If a man knows how, he can chip the right kind of stone into knives, hatchets, and arrowheads. Long, long ago men discovered ways of making stone into tools and weapons. And that was how men began using the kind of materials we call

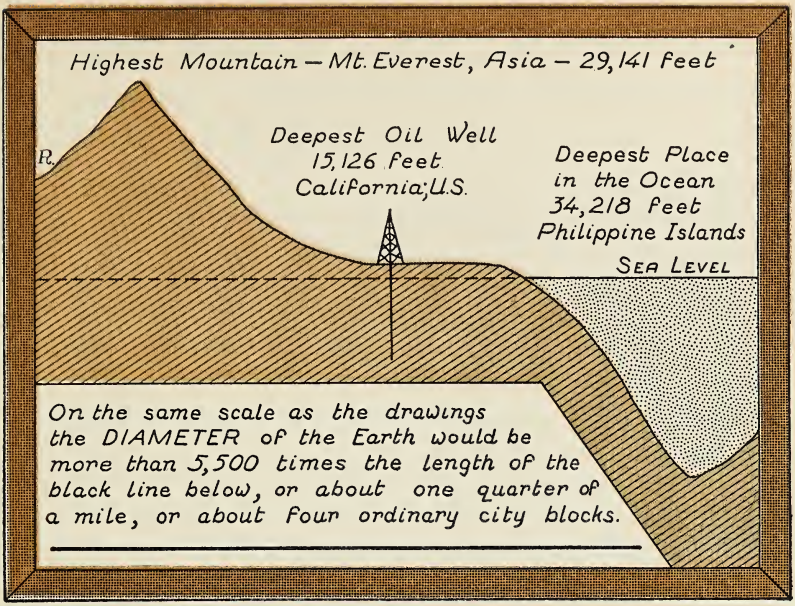
minerals. Minerals are materials we get from the earth. Don't think that a radish is a mineral, because it comes from the earth. You know very well it is a vegetable. Iron is a mineral, so are limestone, and clay, and petroleum.

For thousands of years minerals have been useful to men. For a long time men probably used just any stones they happened to find, if the stones were about the right size and shape. When some men became expert in making stone tools, they became more particular about the kind of material they used. In some places men discovered flint—a kind of stone that is hard enough to scratch glass. Flint chips easily, and a man who was expert could chip a piece of flint and make it into a tool with sharp edges. Then, instead of depending on whatever stones they could find, men began looking for places where they could get a lot of flint at one time for their sharp-edged tools and weapons.

The First Mine

THEIR search for flint started men digging in the ground. Perhaps the oldest mine in the world is a place in Belgium where some of these early miners dug for pieces of flint. Not so very long ago, when modern men explored this ancient mine, the bones of one of these early miners were found deep in the ground. Centuries and centuries ago he had crawled in there to dig out flint. The roof had caved in, and he had died there. Beside the bones of this early miner were some pieces of flint he had dug out of the rock, and his pick that was made out of a deer horn.

Since those early days men have dug many mines, some of them thousands of feet deep. Men have drilled


Highest Mountain — Mt. Everest, Asia — 29,141 feet
Deepest Oil Well
15,126 feet
California; U.S.
Deepest Place
in the Ocean
34,218 feet
Philippine Islands
Sea Level
On the same scale as the drawings
the DIAMETER of the Earth would be
more than 5,500 times the length of the
black line below, or about one quarter of
a mile, or about four ordinary city blocks.

wells, some of them several miles deep, in their search for minerals that people could use. They have discovered many things about the outer part of the earth, the part called the earth's crust. This crust seems thick to us. But compared to the rest of the earth it is thinner than the skin of an apple. The crust is really only a small part of the earth, for the earth is about eight thousand miles in diameter, and even the deepest mines and wells do not go very far into it.

The Earth's Crust

We get our minerals from the crust of the earth, and we can learn something about that part, even though we cannot find out much about the central part of the earth. Suppose we look at some pictures that will tell us a few things about the crust of the earth.

The first picture was taken in a place where part of a hill had been cut away so that railroad tracks

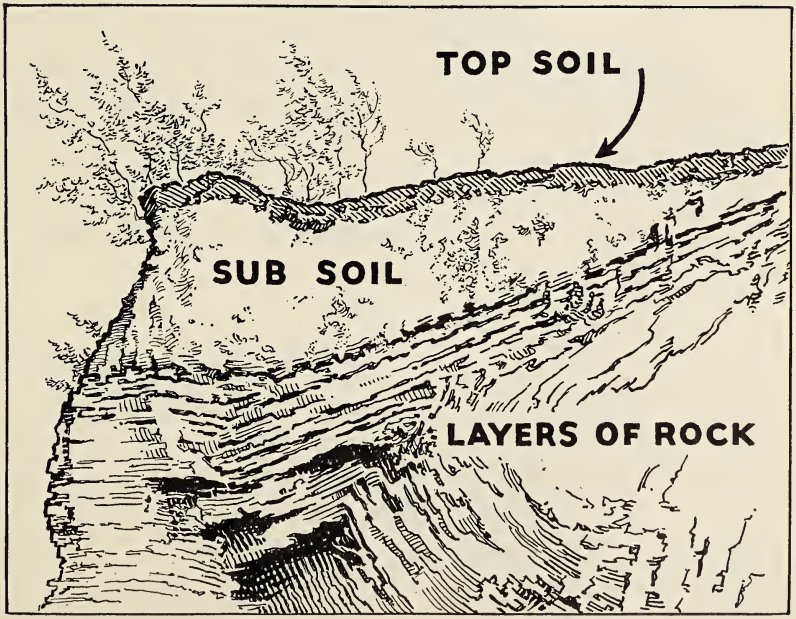
could be laid. Perhaps you have seen a place like this from the window of a train or automobile. The first thing to notice is that the hill in this picture is of rock. It isn't a pile of dirt or sand or clay. Most of it is solid rock.

On top of the solid rock is a layer of broken rock. Near the surface the pieces are smaller and smaller, finer than sand. We call the top layer soil. Sometimes soil is black, sometimes it is reddish, yellowish, or gray.

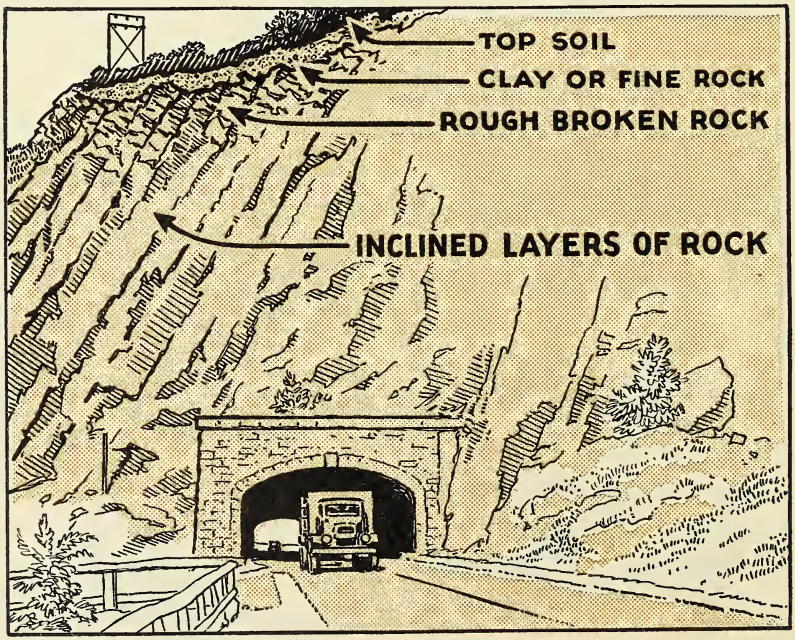
Our earth is like that hill. Perhaps the easiest way to describe it is to say that the earth is an enormous ball of rocky material—although we must remember that there are many things besides rock on the surface —things such as water, trees and other plants, and animals. But the earth is mostly rock. Sometimes the rock is bare, and sometimes it is covered with layers of broken rock. The finest broken rock is called clay, sand, and gravel. When plants and animals, such as worms and beetles, live in this layer, the fine broken rock gradually turns to soil.

The second picture shows the side of a mountain. The rock that is close to the surface of the ground is broken and split. It is like the broken rock you saw in the picture of the hill. Solid rock that is near the surface of the ground becomes broken and split in several ways. Water works into little holes and crevices in the rock. When the water freezes, the rock is cracked and split, perhaps only a little each year. But in time, as years and years pass, the solid rock is broken up. Sometimes roots of trees and other plants grow into cracks and force the rock apart. Rocks will also crack a little when they are warmed by the sun after a cold night, very much as a cold plate will sometimes crack if it is put on a hot stove.

This photograph shows layers of soil on top of layers of rock. The drawing has been made to show you these layers more plainly.



The bottom picture helps explain the photograph at the top of the page. Perhaps you have seen places like this one.



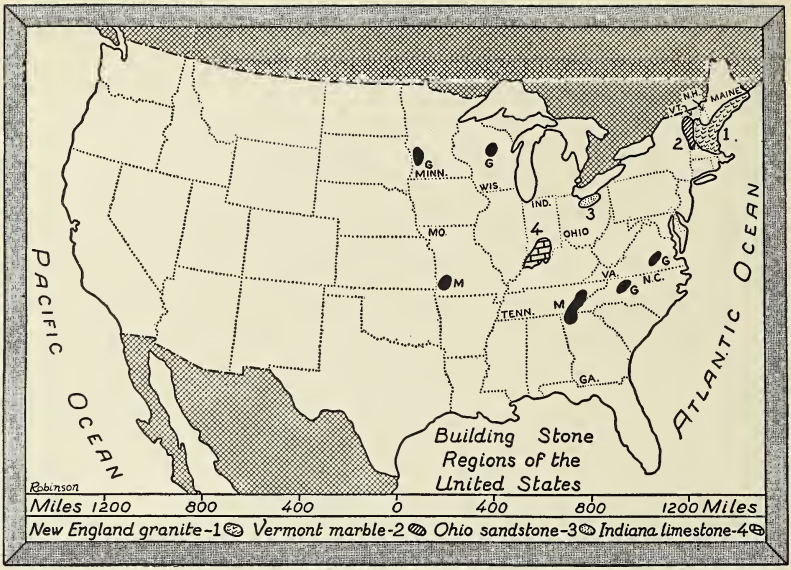
In many places in the world the rock is in layers, as you see it in this picture. Sometimes the layers are of different kinds of rock.

Stone for Building

For a very long time the early people used pieces of rock for tools and weapons. In places where people lived in caves, men must have discovered that pieces of rock were useful in other ways. For instance, stones could be piled up in the entrance of the cave to keep out wild animals, or a big stone rolled across the entrance. Perhaps that was the first use of stone as a building material.

People who lived where stone was plentiful gradually learned how to use stone for building houses. Stone buildings were hard to make, because stone is heavy, hard to handle and move, and not easily cut into shape. But men did become expert in using stone for buildings. The Great Pyramid of Egypt, built nearly five thousand years ago, shows that the early Egyptians had learned how to use heavy stone. In this pyramid are over two million limestone blocks, each one weighing about two and one-half tons—more than twice what an ordinary automobile weighs. You can see that it would take great skill to cut out of the rock, move, and lift into place so many heavy blocks. In many parts of the world different peoples became skilful in using stone for fine buildings.

In old times the finest and largest stone buildings were usually made for the king or for the priests. Because kings wanted their houses to be splendid, and people wanted fine temples where they could worship, men began to look for ways to decorate these buildings. They learned to carve stone and to make more beau-

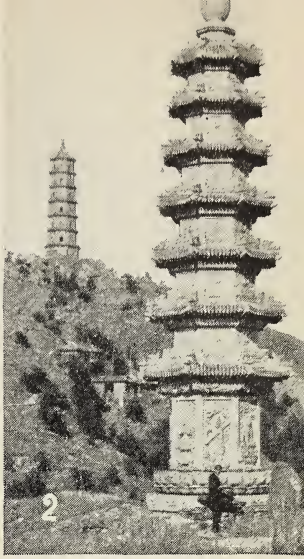


Stone for building is taken out of quarries in many different parts of the country. This map shows where some of the most important kinds of building stone are quarried.

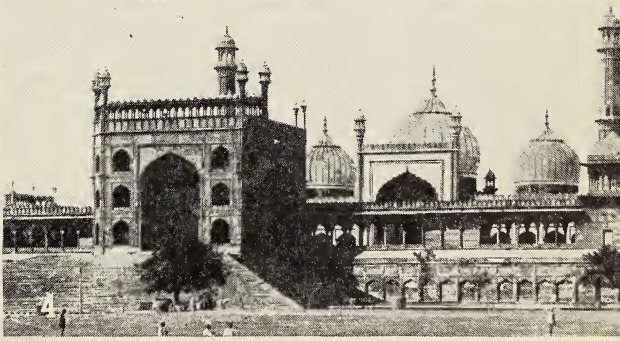
tiful buildings. Men also learned to make statues and other artistic things of stone.

Today many kinds of stone are used in many parts of the world for the finest buildings. In some places, where stone is cheap and easy to get, it is used for houses. Building stone is taken out of the ground, out of quarries where men cut the stone. The map on this page shows places in the United States where stone building materials are quarried.

Besides using stone as it comes from the ground, men have discovered other ways to use it. Long ago the Romans invented cement. Perhaps someone built a fire between two rocks and found that the rocks could be crushed to a powder after they had been burned. When the powder was mixed with water and then allowed to dry, it became very hard. The Romans used cement in making their roads and buildings, which

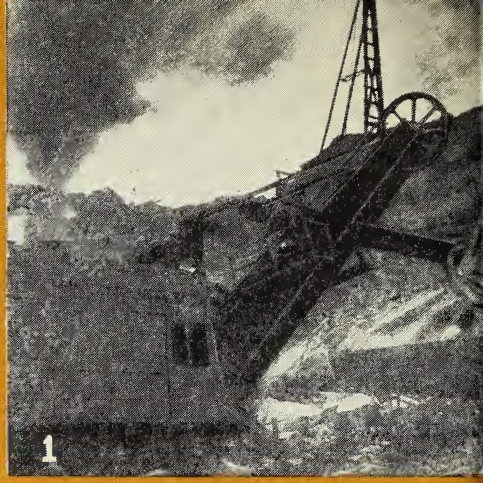


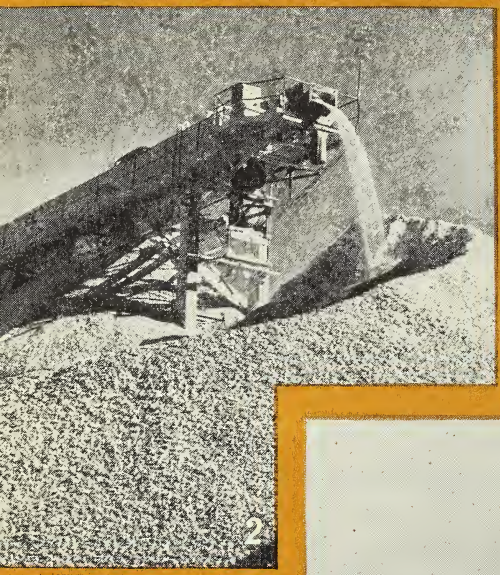
Centuries ago people in different parts of the world learned to build with stone. Use an atlas to locate the places where these buildings are. Picture 1: Maya temple in Central America. Picture 2: Chinese pagoda. Picture 3: Egyptian temple. Picture 4: Hindu temple in India.



Picture 5: Cliff dwellings built by Indians at Mesa Verde, Colorado. Picture 6: Temple in French Indo-China.

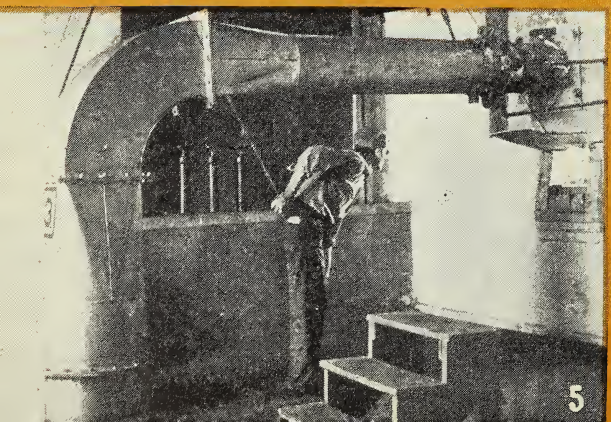
A group in the class might read about cement-making in the encyclopedia and in other books and make a report that will explain each of these pictures.

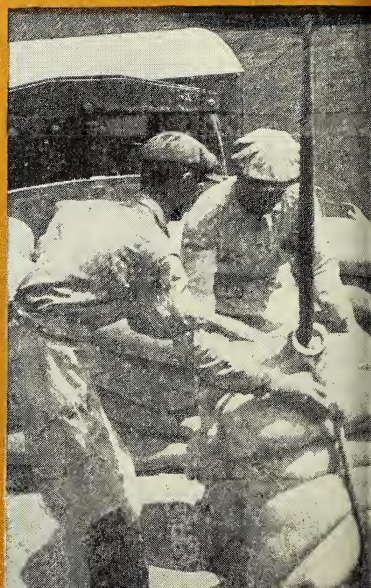




Since Roman times men have made cement from some kinds of stone.

Today the cement factories make their product with the help of huge machines.





were so strongly built that some of them have lasted down to this day. Today we mix cement with crushed rock, sand, and gravel, sometimes with cinders, and make concrete. Concrete is used for buildings, for highways, and for bridges.

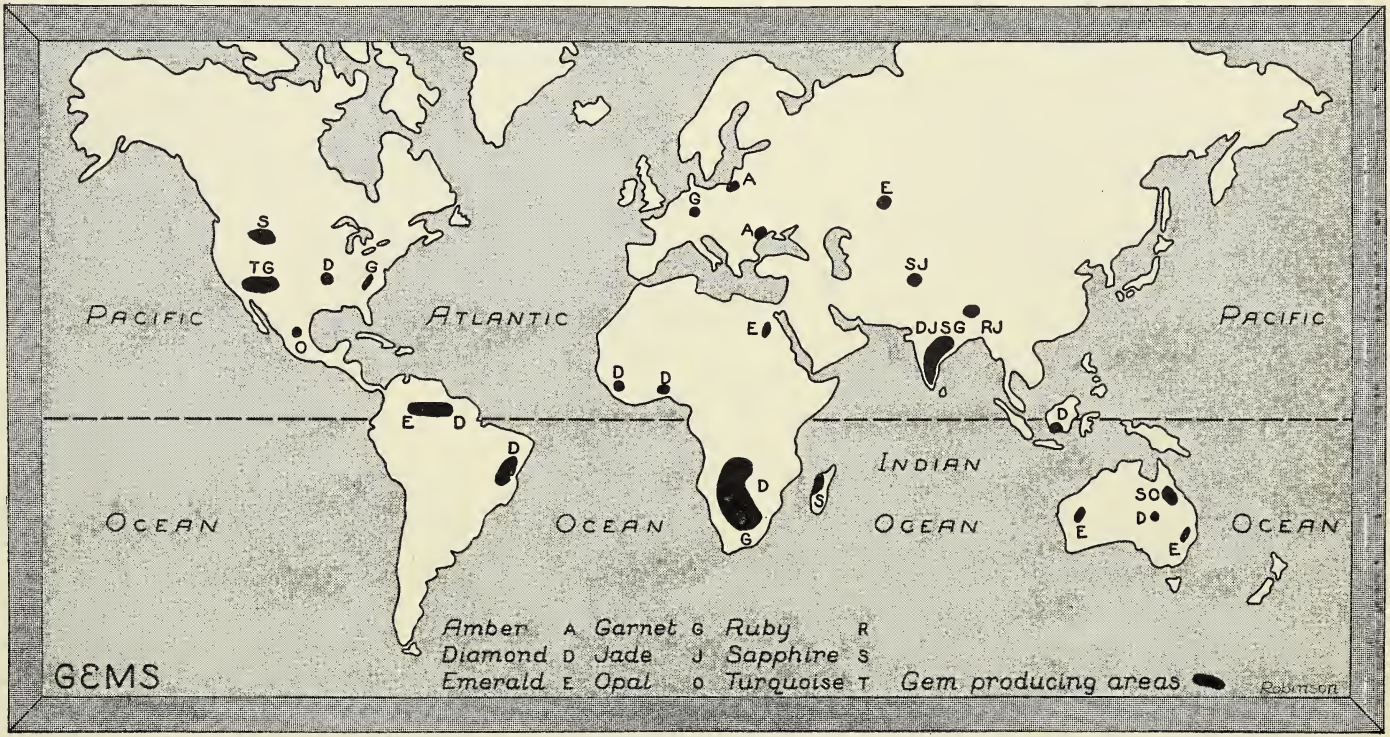
The stone called limestone is very useful in building. It is used the same way other building stone is used, but it is also burned in ovens, called kilns, to make lime. This burned limestone, or lime, is used in making plaster and mortar. Gypsum, another kind of lime rock, is also used to make plaster. Gypsum is also made into tiles and blocks used in building.

Building materials made of lime, gypsum, and other minerals are rather common. Perhaps you can see some of them in a building-material yard. If there is one in your neighborhood, you might arrange to visit it. The man who runs it might be willing to let your class have some of his samples. Very often such samples are too expensive to give away. In that case your class might borrow them to make an exhibit. You could promise to return them after you had the exhibit.

A good way to show how mineral materials are used in building would be to borrow a doll house. Strings or ribbons could be strung from different parts of the house to samples of materials. If you did not have samples of everything, you could run the strings or ribbons to cards that explain the kind of material used in that part of the house.

Stones to Wear

CERTAIN kinds of stones, when cut and polished, are called gems. Because of their beauty people have wanted them for many centuries to use in jewelry. In the Old Testament there are a number of refer-



The black spots on this map of the world show the places where precious stones are found. Letters show the kinds.

ences to the ruby, the sapphire, and other precious stones, which show how much they were valued in the world of the ancient Hebrews. The diamond, one of the most expensive gems, has been admired by people for hundreds of years. Other kinds of gems, not so scarce and not so costly, are agate, turquoise, amethyst, topaz, carnelian, and opal. People who cannot afford real gems often buy imitation ones that look like the more expensive stones.

Pottery Is Made of Earth Materials

Stones were not the only minerals that people learned to use long ago. Even before men were using stone for building, they were using other materials from the earth. Clay is a mineral, too. Early people used it to plaster huts made of branches or reeds. A basket woven of twigs or grass could be used for carrying water if it was plastered with clay or mud.

We do not know how people discovered that clay could be made into pottery. Perhaps a basket lined with clay was placed too close to the camp fire. If the fire was very hot, the clay would be baked hard. When the fire cooled, the reeds in the basket had been burned away, but there would be a jar or vessel, shaped like the basket and marked with the pattern of the reeds from which the basket was woven.

We can be fairly sure that something like this must have happened because in many places the earliest pottery is marked with a basket design. Anyway, people somehow found that clay could be changed by heat into pottery. They learned ways to mold moist clay into smooth, even shapes, and to bake it with fire. Perhaps the design of the basket which burned away gave people the idea of decorating their pottery. Any-

This pottery was made centuries ago. The bowl in the lower right-hand corner was made by molding clay inside a straw basket. The marks were left when the basket burned away. The bowl in the upper left-hand corner was made with clay and twigs, and the marks of the twigs can be seen. Marks like these gave people the idea of decorating their pottery. The other two bowls were decorated by scratching the clay before it was baked in patterns like woven baskets.

way, many early peoples marked their pottery with various designs and found other materials they could use for paints so that they could color the designs.

People in many parts of the world learned to make pottery. They used the kind of clay they found in the place where they lived. Some clays made thick, heavy pottery, while other clays made thin, fine vessels. Some clays baked to a red color, some to a brown, and others to lighter colors.

For a long time the Chinese were the only people in the world who knew how to make fine white pottery. They used a special kind of clay and had special ways of baking and coloring their pottery. And they

The girl who drew this cartoon thought that pottery might have been discovered in the way shown in these pictures. Perhaps you can draw pictures to show a different way.

managed to keep their materials and their ways of working a secret. Finally people in Europe discovered a clay like that used by the Chinese and so were able to make fine white pottery, too. To this day we call such pottery china or chinaware. In fact, we call many kinds of crockery and pottery by that name.

Bricks Are a Kind of Pottery

POTTERY was not the only thing early men found that they could make from clay. They learned to make bricks from mud and clay and dried them in the sun. Bricks that had been dried that way were just hardened mud or clay, and water would turn them soft again. But someone discovered that bricks baked in a fire, like pottery, were almost as hard as stone. They did not get soft or melt away when it rained.

This Egyptian is making mud bricks. He packs mud and some straw into a wooden mold and then turns out the brick to dry in the hot sun.

These Chinese workmen are building a house of sun-dried bricks. They live in a part of China where there is not much rain. In other parts of China baked clay bricks and tiles are used.

In some places where the climate was dry and little rain fell, people did not need to bake their bricks in fire. Sun-dried bricks were good enough and much less trouble. The Egyptians used sun-dried bricks for their houses, and so did the people who lived in the valleys of the Tigris and Euphrates rivers. To hold the mud or clay together, they mixed straw with it. Perhaps you have read in the Bible how the Hebrew captives were forced to make bricks by the Egyptian king (Exodus 5).

In America, some of the Indians of the Southwest, the Zuñis, for instance, learned to make sun-dried bricks from the desert soil. Both the soil there and the unburnt bricks made from it are called *adobe*. In Italy, where there was more rain than in Egypt, the Romans

used fire-baked bricks in many of their buildings. They also made tiles from clay and baked them, too.

Since early times, fire-baked bricks have been made and used in many parts of the world. They are used for buildings, for pavements, and sometimes for building large sewers. Small sewers and drains and roofs are often made of tiles, which are a kind of brick or pottery. Millions of bricks and tiles are made and used every year in the United States alone.

Special Ways to Use Clays and Other Earths

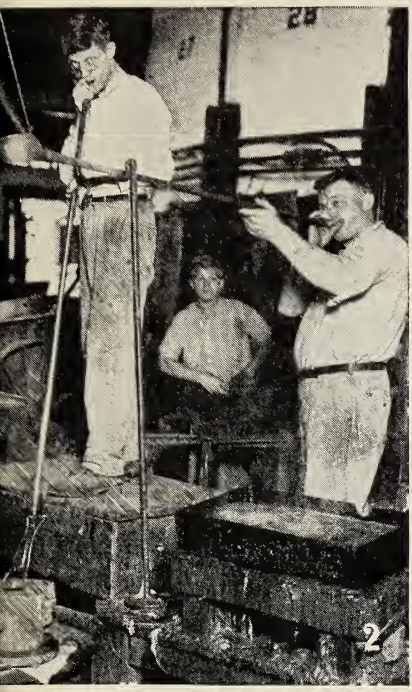
SPECIAL kinds of clays and other earth materials are used for many purposes. Some of the cleaners that are used to keep kitchen sinks, lavatories, and bathtubs clean are made from earth materials ground very fine so that they will not scratch the enamel of the sink or lavatory or bathtub. Other earth materials are used for silver polish and for tooth powder.

Another kind of earth material is used for grinding metals. Perhaps you have seen a grindstone or an emery wheel. These grinding and sharpening stones are made of earth materials. Some are cut out of pieces of stone that are quarried. Others are made of crushed or powdered materials that are mixed with glue or cement and then molded into the right shape.

A special kind of clay is heated in electric furnaces in order to get aluminum. As aluminum is an important metal today, and is being used more and more every year, men keep looking for places where this kind of clay can be found. If you ask your mother what the pots and pans she uses for cooking are made of, you will probably find out one of the important uses of aluminum. A more important use is for airplanes

A class group might collect pictures showing ways that clays and earths are used.

1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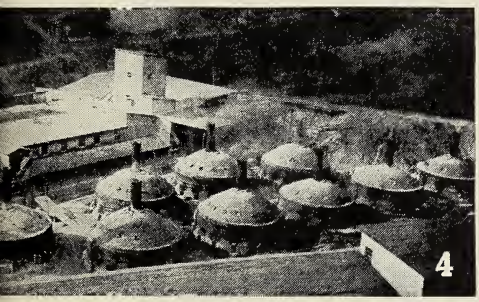
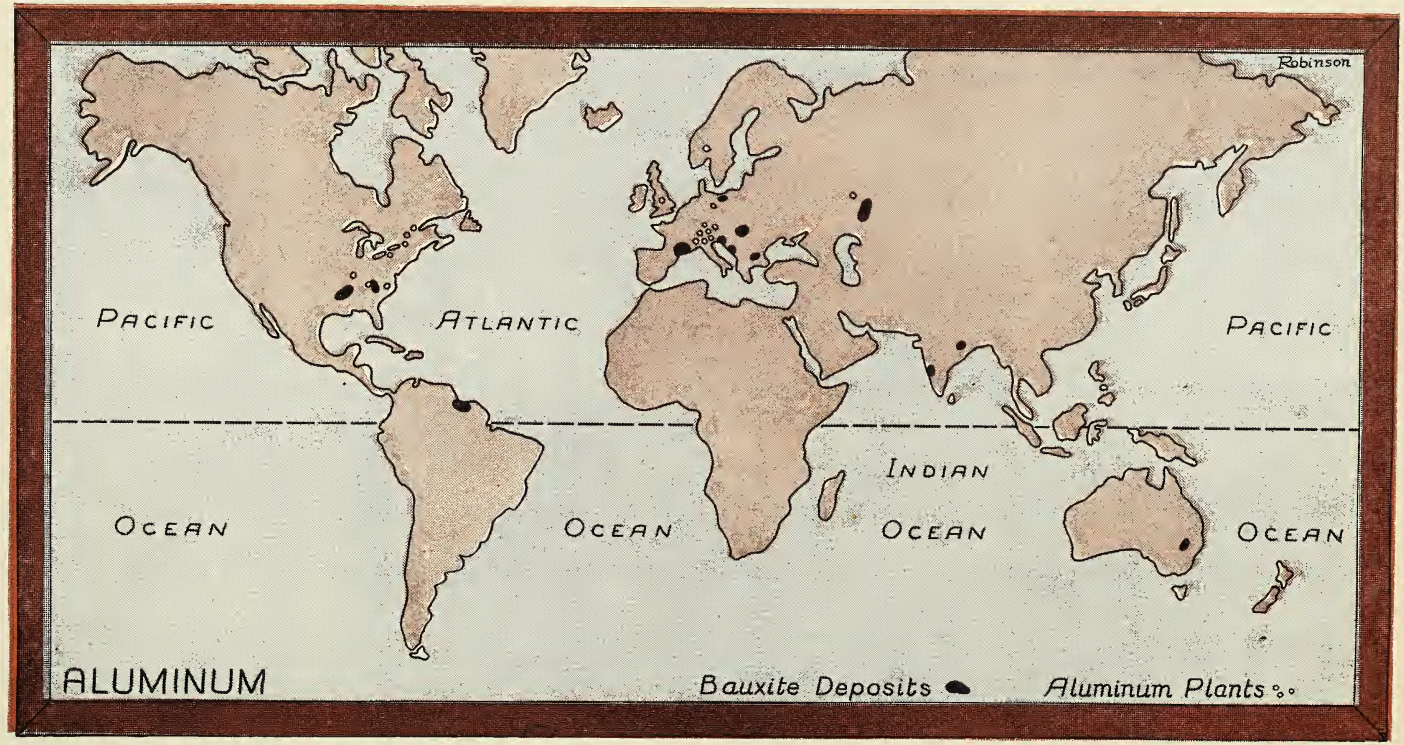

4

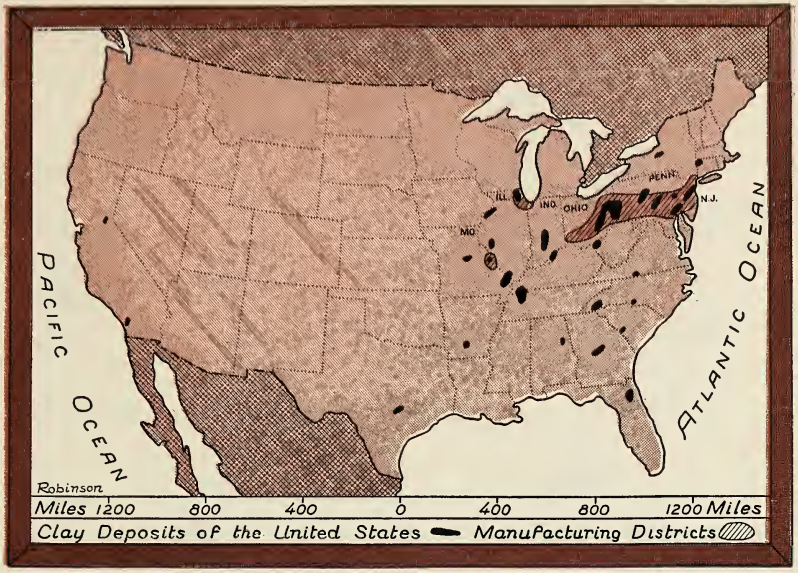
Pictures 1, 3, and 6 show potters at work. Picture 2 shows glass blowers. Picture 4 shows the big ovens, or kilns, at a brick works. Picture 5 shows the yard of a plant that manufactures sewer tile. Make a list of other uses for clays and earth materials.

5

6



The black spots show where bauxite is found. It is a clay-like mineral from which aluminum is made.



The black spots on the map show where important beds, or deposits, of clay are found. The shaded parts of the map show places where important clay-manufacturing plants are located.

and streamliners. Mixed with copper and some other metals, aluminum becomes hard and strong enough to use for trains and planes.

The First Use of Metals

MUD, CLAY, and stone were not the only earth materials that our early ancestors learned to use. But it was a long time after people were making pottery that they discovered the materials we call metals. Probably metals were first discovered in chunks, which their finders perhaps thought were a strange kind of stone. We know that lumps of gold, called nuggets, must have been found, for this metal was used for ornaments long before man knew how to dig in the ground to mine it. Besides gold, copper was probably the earliest metal found by ancient men. There

This cartoon shows how one girl thought copper was discovered. You might draw other pictures showing how you think copper or other minerals might have been discovered long ago.

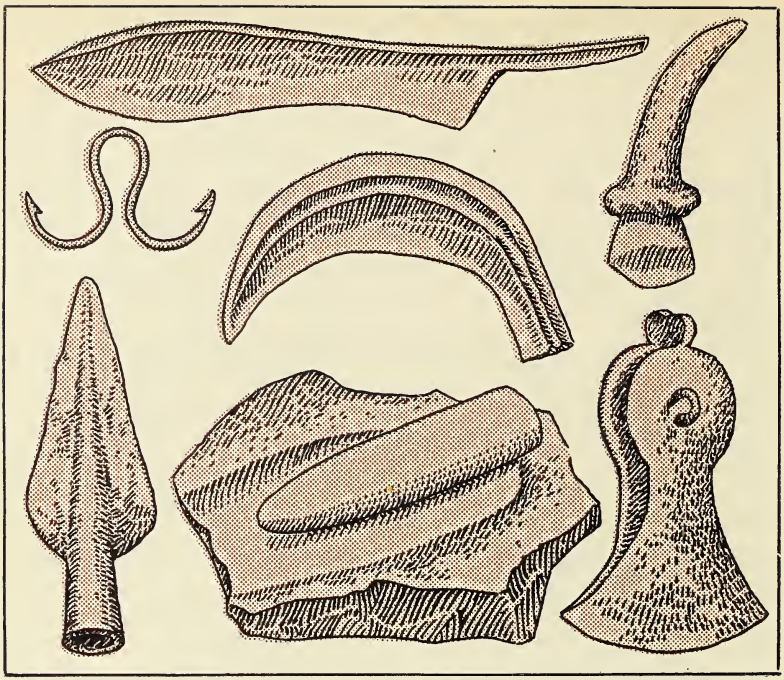
are some places in the world where chunks of copper can be easily dug from surface rocks.

After the discovery of metals, it was a long time before someone discovered that they were useful. But someone finally did find that copper could be hammered into shape and could be given a sharper edge than a stone tool. Naturally people wanted these new copper tools.

When men began using copper tools, they had to find more and more copper chunks. Then someone discovered that copper could be melted out of some rocks by using fire. We have to keep saying "someone" because all these discoveries happened so long ago that we cannot ever know who made them. Perhaps the way to get copper from rocks was discovered by accident. Someone might have built a fire close to a rock containing copper. We would call the rock copper ore. The heat melted the copper, which must have run out of the rock and then hardened in the ashes after the fire went out. Later on men discovered how to shape copper by melting it and letting it run into molds made in sand or clay.

It might have been another accident that showed men how to melt tin with copper and make bronze. Or men might have found rocks that contained both kinds of ore. Rocks of that kind were mined near ancient Egypt. Bronze is harder than copper, and bronze tools were better than copper ones. For many centuries men used bronze tools. Copper and tin mines became important, for without them people would have had to use stone tools.

In ancient times, however, there were many copper mines but only a few tin mines. When the Egyptians were using bronze tools, they could get copper from



The drawings show different tools that were used when people learned to make bronze. But people did not throw away all the old-fashioned tools and use nothing but bronze. One of the tools shown is a chisel made of stone and deer horn. Another is a hand mill of stone for grinding meal. The other tools are bronze.

mines in their own country, or from mines on the island of Cyprus in the Mediterranean Sea. But the Egyptians had to buy their tin for making bronze from the Phoenicians. The Phoenicians were sailors and traders, not miners, but they knew where tin was being mined. They kept this knowledge secret for many years.

And where did the Phoenicians get their tin? These daring traders headed their small boats out into the Atlantic and sailed up to the southwestern tip of England and traded there with the ancient Britons for tin.

Today the people of the United States must depend on ships to bring in most of the tin used here, for we have little of our own. The largest tin mines in

The most important tin and copper mines are shown on this map. There are more copper mines than tin mines.

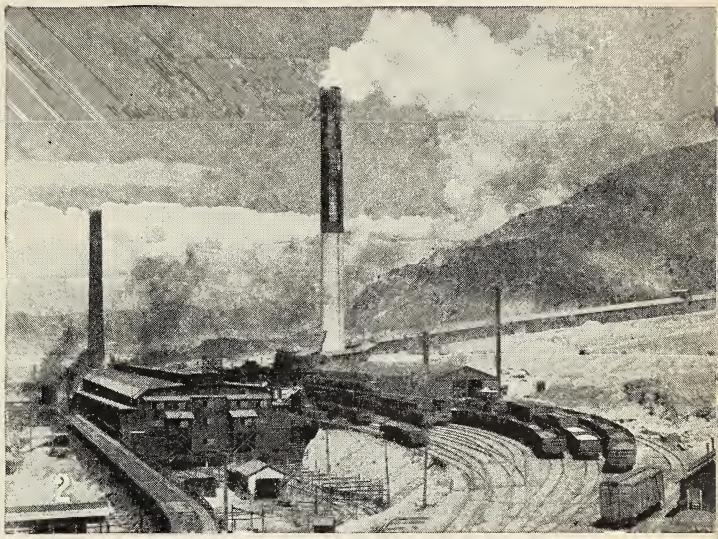
the world are many thousands of miles from us, as you can see by looking at the map.

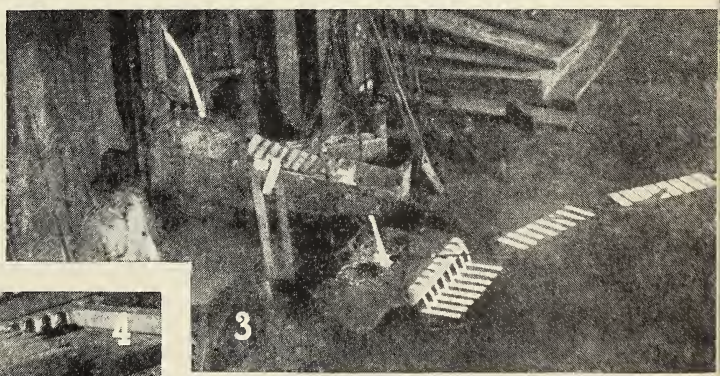
We use tin not only to make bronze, but for many other purposes as well. Tin is used for covering sheets of steel so that the steel will not rust. Tin cans are not made of solid tin, but of steel with a thin coating or plating of tin on it. This tin plate, as it is called, is used in making cans, toys, roofing, and hundreds of other things. Kitchen spoons and other utensils are sometimes covered with a thin coating of tin, because the tin does not rust and is easy to keep bright and clean. When tin is mixed with lead, it makes solder, which is used for fastening metals together. You may have watched a workman called a tinner solder a gutter on a house, or mend a hole in a pan with solder.

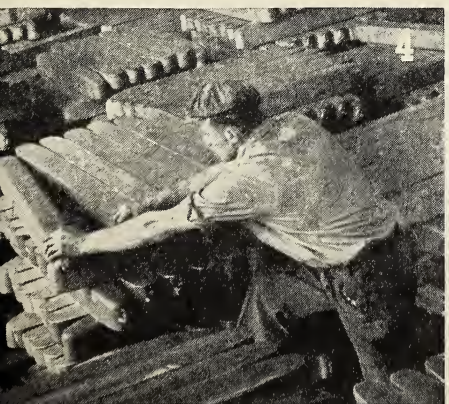
We do not make tools of bronze or of copper today because we have materials that are stronger and that will sharpen better. But we do use copper more than ever, because it is needed in making electric motors, dynamos, and all kinds of electrical machinery and wires. Our country does not have to depend on other countries for copper, because some of the largest copper mines in the world are in North America. The map shows where they are.

Iron, the Most Important Metal

Although we do not have to depend on copper or bronze for tools, people long ago had few other metals. It was a long time after men became expert in making bronze tools that they discovered iron, which was harder than bronze and made better tools. The people of long ago also used iron for other things besides tools. You can read in the Old Testament about a battle in which nine hundred chariots of iron were







Picture 1 shows a copper mine. This kind of mine is called a strip mine. Picture 2 shows the smelter near the mine. Picture 3 shows molten copper pouring from the furnace into molds to make copper bars like those in Picture 4.

used against the Hebrews. Because the invaders had iron, they were hard to beat. The Hebrews, who were a herding people, had little iron.

In time people learned how to melt iron ore with charcoal and limestone and to make steel. With good tools of hard steel men were able to use more and more of the materials found in the earth. They could shape rocks into building stones with less trouble, and dig farther into the earth for metals. With the help of good tools, men could become more and more expert workmen.

Men who worked in metals were called *smiths*. You may find it interesting to learn that "smith" comes from an old word which meant one who smites or strikes. Blacksmiths worked with iron and steel, but there were also coppersmiths, silversmiths, and goldsmiths. They learned to make other things besides tools and weapons out of metals. But for many years the men who made weapons were the most famous of all smiths. There are many legends about swords and the men who made them at their forges. One of the most famous swords told about in these legends belonged to the great hero Siegfried. He made the sword himself, pounding the white-hot blade until the anvil rang, and the "sword found its voice and sang."

Although there are many legends about famous smiths and the weapons they made, for a long time iron and steel were not very important except to use in making weapons. During the Middle Ages, when men fought with bows and arrows, battle axes, spears, and swords, iron and steel were used for these weapons and for the heavy armor of the knights. Steel was also used for a few tools, but not for much else. People did not use iron and steel in building the way they do now.

And they did not make any machinery to speak of, for most things were still made by hand with hand tools.

You can get an idea of how much the production of iron has increased by making a chart. This chart would show the amount of iron that was mined in England during different years. In the Middle Ages, the English produced about 100 tons of iron every year. In 1740, some years before the American colonies became independent, the English produced more than 17,000 tons of iron. In 1825 they produced 600,000 tons, and in 1933 nearly 6,500,000.

The reason more and more iron has been produced is that people have kept finding more ways to use iron and steel and better ways to produce the iron and steel. In the Middle Ages, iron and steel were used for weapons and for a few hand tools. Later on men began inventing machines to help them do their work. For spinning thread they made spinners of metal instead of wood, and for weaving cloth they made looms of metal. They made metal pumps and engines to run the pumps. Railroads were built with iron rails, and steam locomotives were invented and made of iron and steel. Bridges were built of steel instead of wood and stone.

People not only used more things made of iron and steel than ever before, but they also had to use more machinery in order to make these things. And this machinery was also made of iron and steel and other metals.

Why Fire Became Important

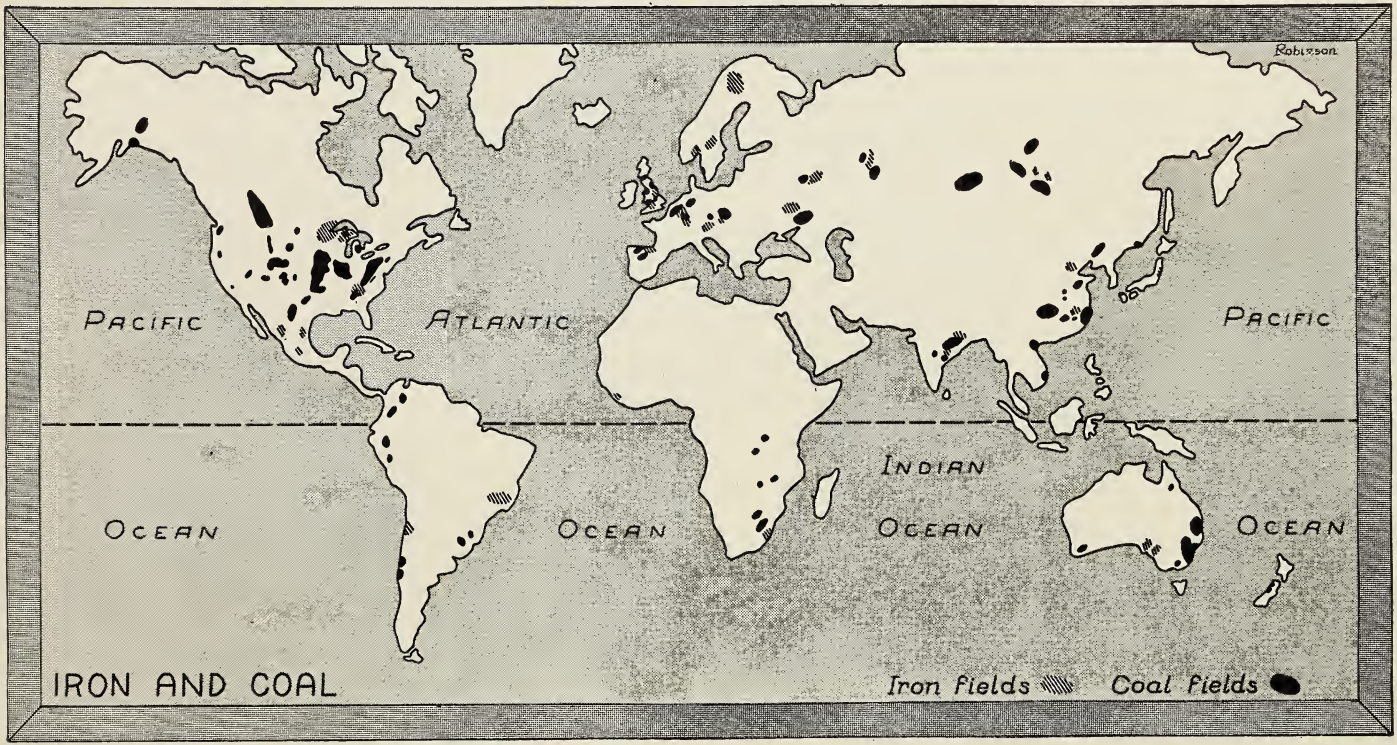
In working with metals men had to use fire. After being mined, most metals had to be melted out of the rocks, called ores, with very hot fires. This work

is called smelting. Iron and certain other metals were easier to pound into shape when they were heated red-hot or white-hot in a fire. Fire had to be used to melt metals that were poured into molds.

For many centuries men built their fires for smelting ores, for softening metals, and for making pottery in the same way they built the fires they used for warmth and for cooking. In most parts of the world they used wood for their fires, because this plant material is easy to burn. Only a few people used animal materials for their cooking fires. The Eskimos, for example, had no wood, and burned the fat of walrus and seal to make light and heat. Some Indian tribes found that they could burn certain kinds of dried oily fish to make light.

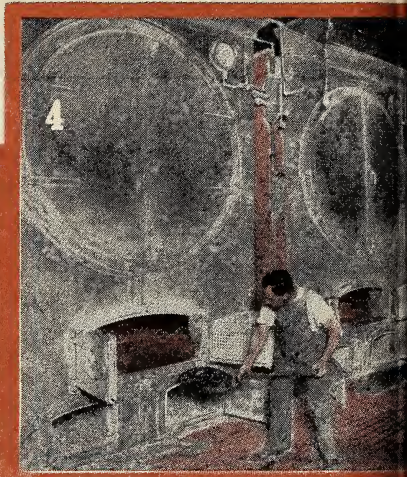
In different parts of the world peoples had discovered special ways to make fires for cooking and lighting. Lamps and candles were invented, and people could burn oils and waxes. These oils and waxes were made from either plants or animals. People used the fat of animals, such as tallow from sheep, oil from whale blubber, lard from hogs, and suet from cattle. They also used oils or waxes made from the leaves or fruits of certain plants. Oil that would burn could be pressed from ripe olives, from many kinds of nuts, and from some berries. The Romans, for example, burned olive oil in their lamps. Some trees, like the turpentine tree, had sap that would burn fiercely.

At last men found a more convenient fuel for building fires. It was coal! It was called "stone coal" at first because the word "coal" meant the black charcoal made from wood. Now men did not have to cut down acres and acres of forests in order to get fuel for smelting and for working with metals and clay, and for heat-



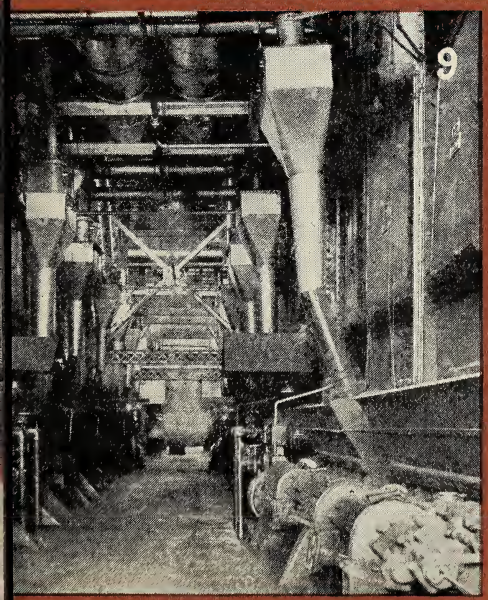
Black spots show where deposits, called fields, of coal are located. Shaded places show deposits of iron ore.

The pictures on these two pages show people using different kinds of fuel in different ways. In Picture 1 an Irish blacksmith is using peat for a fire. In Picture 2 a blacksmith, deep in a mine, is using coal in a forge. The Boy Scouts in Picture 3 are using wood to cook their meal.

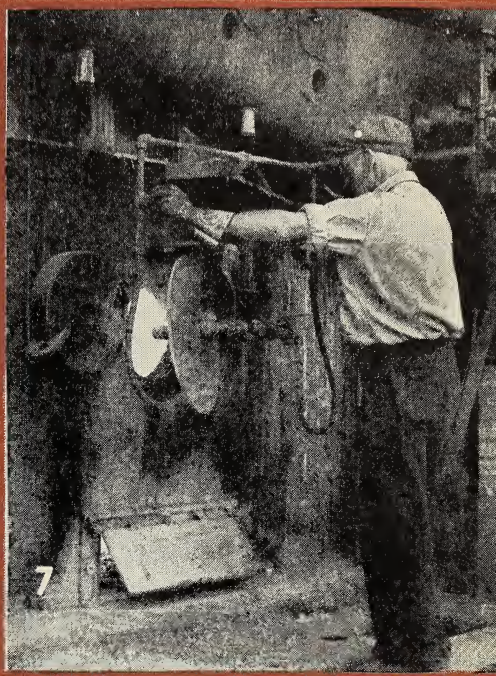


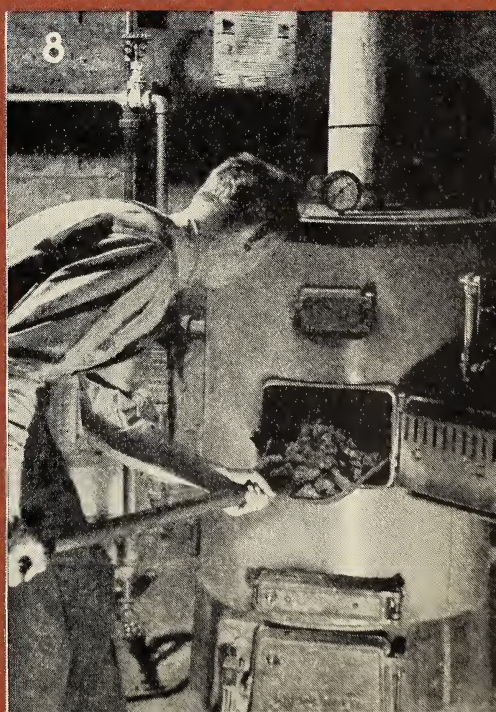
The man in Picture 4 is shoveling coal. In Picture 5 the fuel is wood.

There are other kinds of fuels and also other ways to use them. Your encyclopedia will help you to find them. You can also collect pictures that will show how these fuels are used. Mount the pictures on large pieces of wrapping paper. You might make a special set of pictures showing the kinds of fuel used in your community and the ways they are used.



In Picture 6 the woman is burning kerosene. The man in Picture 7 is burning another kind of oil. In Pictures 8 and 9 coal is being used.





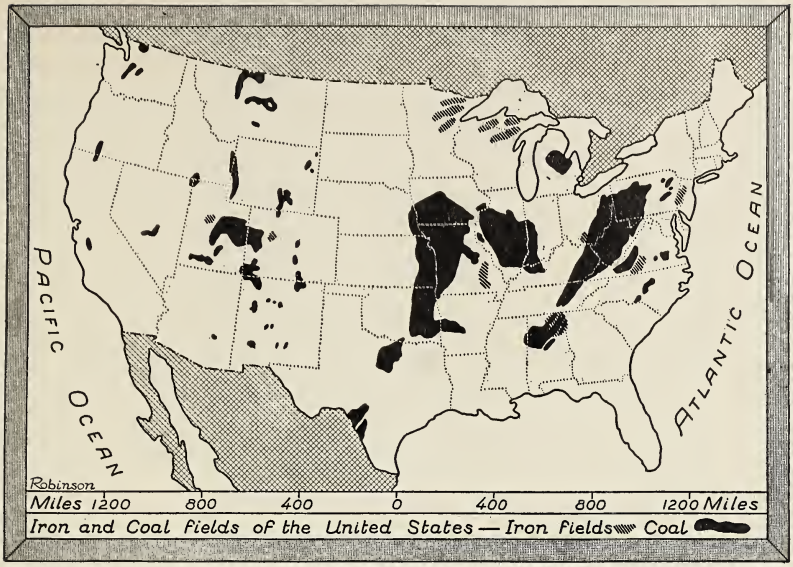
ing their homes and public buildings. As people used more and more iron and steel, more and more coal was mined, so that the iron ores could be made into iron and steel and the metals worked into shape. Coal mines became as important as iron mines. That is why the map on the next page shows both the iron mines and the coal mines of the United States.

Some of the iron mines of the world are not close to coal mines. The iron ore is shipped away to places where there are iron foundries and steel works. In Sweden there is a very large iron mine which produces thousands and thousands of tons of ore every year. Most of this ore is shipped away, for the Swedes do not have much coal to use for smelting. But although they lack coal, the Swedes have great forests. For many years they have been making charcoal from wood and using the charcoal to smelt iron. This Swedish iron is particularly good for making sharp knives and fine tools and brings a very good price. But the Swedes know they cannot smelt all their iron ore with charcoal, for that would mean cutting down all their forests. And so most of the ore is shipped to other countries where it is smelted with coal.

Iron and Steel in the United States

In the United States, iron ore, coal, and limestone are melted together in huge furnaces lined with fireproof brick. Usually for each ton of iron ore that is put into the furnace, one and one-half tons of coke made from coal and one-third ton of limestone are used.

Since all three of these materials are not usually found in the same place, at least one of them must be carried to the smelters. Usually it is cheaper to


PACIFIC OCEAN
ATLANTIC OCEAN
Robinson
Miles 1200 800 400 0 400 800 1200 Miles
Iron and Coal fields of the United States — Iron fields Coal

The iron and coal resources of the United States are easier to locate on this map than on the world map on page 209.

haul the iron ore to the coal and limestone than to haul the coal and limestone to the place where the ore is mined. There is less of the ore to be hauled.

The first iron foundries and steel mills in our country were built in regions where the ore could be mined. These mills were in mountainous forest country, where plenty of trees could be cut down to furnish fuel. Later, when coal was used instead of wood, some of these mills went out of business because there was no coal near them. However, those in the eastern part of Ohio and in Pennsylvania stayed in business because there was plenty of coal near them.

There are a number of other places in the United States where steel is made. Coal and iron were discovered close to Birmingham, Alabama, and steel mills were built there. Coal and iron were discovered close together in Colorado, and steel mills were also built there.

The picture at the top of the page shows an old smelter that was built in colonial times. It was built of stone, and the iron ore, charcoal, and limestone were dumped in at the top. The lower picture shows a modern steel plant with huge furnaces that run day and night making different kinds of steel from iron ore and scrap iron.

Our largest iron mines are at Hibbing, Minnesota, on the shore of Lake Superior. There is no coal near these mines, and the ore is shipped in lake steamers to steel mills in cities such as South Chicago, Gary, Detroit, Cleveland, Erie, Lorain, and Buffalo, where coal is cheap and does not have to be hauled so far.

Nickel, Zinc, and Other Metals

OTHER metals are also mined in the United States. Nickel, zinc, and lead are important. Nickel is used for making brass by melting it with copper. A metal made this way, by mixing metals, is called an alloy. Nickel is used in several other alloys, especially in making some that are very hard and strong. Once great quantities of nickel were used for plating, but it has been found that another metal, called chromium, makes a shinier, harder finish than nickel.

Zinc is important because it is used to coat iron so that the iron will not rust. Galvanized iron or steel is metal with a thin coating of zinc. You have seen garbage cans, house gutters, and pipes made of galvanized iron.

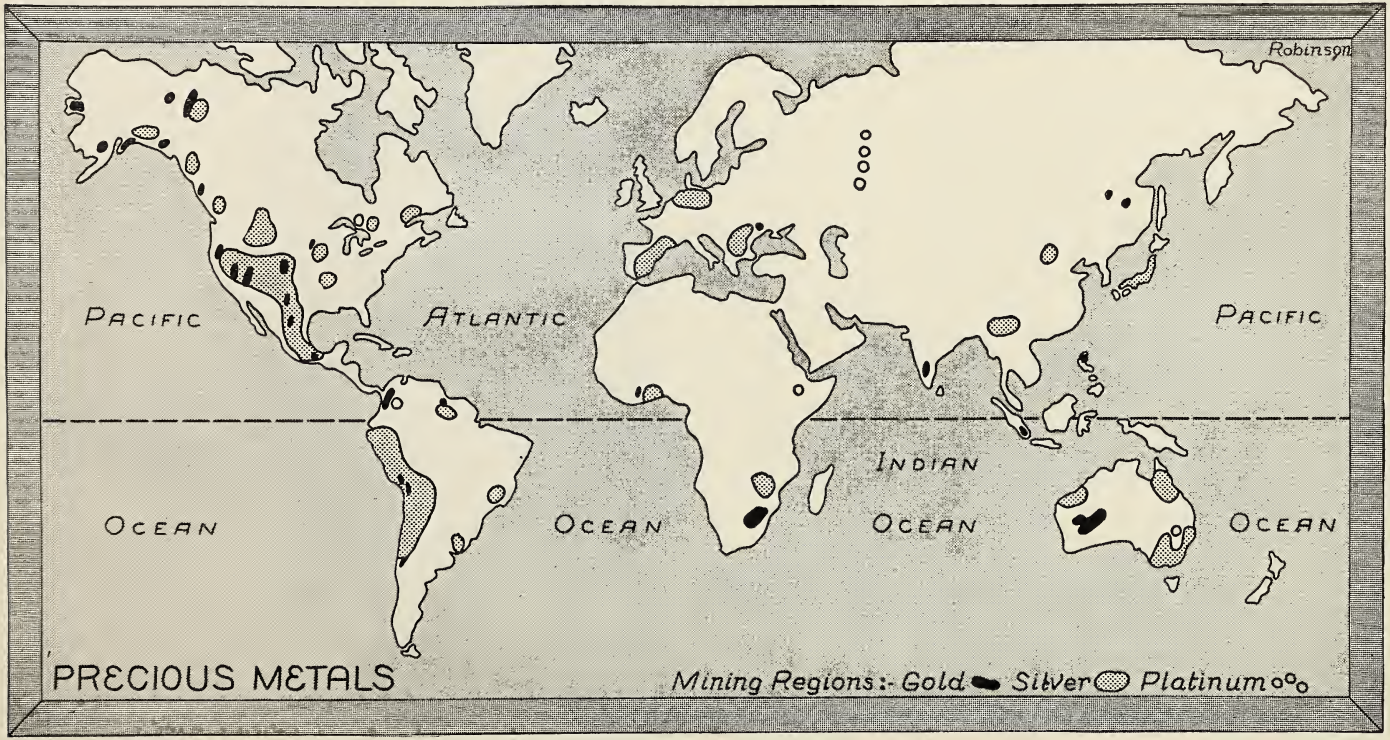
Lead is another metal that is useful because it does not rust or wear away for a long time. Lead is soft but strong, and it is used for making water pipes, for the outside of cables that contain electric wires, for roofing, and for many other purposes. When tin and lead are melted together, they make solder.

Gold and silver are also mined in the United States. The map on page 217 shows where the largest gold and silver mines are. The map also shows where platinum is mined. Gold, silver, and platinum are called precious metals because they are expensive and not common. These metals are used for other things be-

This map of North America shows where three important metals are mined. These metals are also found in other parts of the world.

sides making coins, jewelry, and beautiful things. One of the uses of silver, for example, is in making the chemicals that are put on camera films and plates.

There are many other metals that are used today. The tip of a fountain pen is a special kind of hard metal. The tiny wire inside an electric lamp is another kind of metal. And there are still other metals that are used to mix with steel to make the steel especially tough or hard or springy. Men who work with metals are always looking for new ways to make things, for new materials to use.



Platinum is the most expensive of the three precious metals. The map shows that it is mined in only a few places.

This old photograph shows the first oil well drilled in the United States. Colonel Drake, whose name you may be able to see on the derrick, drilled it near Titusville, Pennsylvania.

Petroleum Is an Earth Material

METALS, clays, and rocks are not the only materials which we get from the earth. A very important earth material is petroleum. Its name means rock oil. Gasoline, kerosene, benzine, naphtha, paraffin, besides many different kinds of oils and grease are made from petroleum. Hundreds and hundreds of other products are also made from it, such as dyes for cloth, flavorings, medicines, inks, waxes—too many products by far to mention here. It is so important that it is sometimes called "black gold."

Petroleum was not of much use to men until about one hundred years ago, although people had known

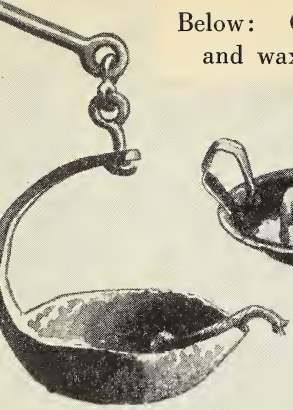
about it for centuries. Some of the peoples of long ago, for example, the Egyptians, the Greeks, and the Romans, used a little petroleum in lamps. But people seemed to prefer burning other materials, perhaps because petroleum smelled and smoked so badly.

The Egyptians used a thick kind of oil, a mineral called bitumen, for making things waterproof. Years later, in the time of Harun al-Rashid, the Caliph in the "Arabian Nights" stories, the Arabs were using bitumen for waterproofing boats and for sealing up jars in which they stored grain and other food.

In America some of the Indians used petroleum to grease their bodies or took it as medicine. White settlers sometimes found petroleum when they drilled wells for salt. In a few places it came to the surface and floated on top of water in pools and ponds. The settlers thought the petroleum was a nuisance and for many years did nothing with it. The story of how petroleum came to be used is an interesting one. It shows us how people find a use for some material and then look for ways to improve it or look for still better material and better ways to use it.

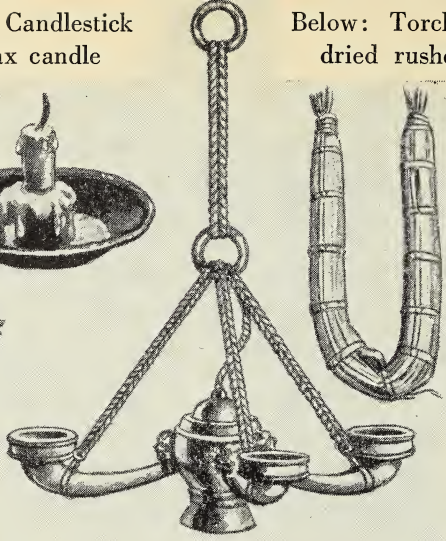
Discovering Uses for Petroleum

About 1840 the people in the United States were lighting their homes with candles or with lamps. Most of the lamps burned whale oil, which was expensive and smelly. Then a new kind of oil was made. It was called coal oil because it was made by heating soft coal. This new kind of oil burned well in lamps and was cheaper than whale oil. People wanted it, and men experimented with ways to make more of it. They found that something like coal oil could be made from petroleum. This kind of oil was called kerosene.



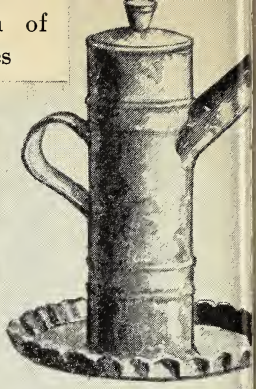
Above: Colonial lamp to burn grease

Below: Candlestick and wax candle



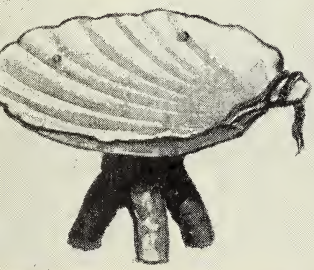
Above: Hanging Roman lamp burning olive oil

Below: Torch of dried rushes



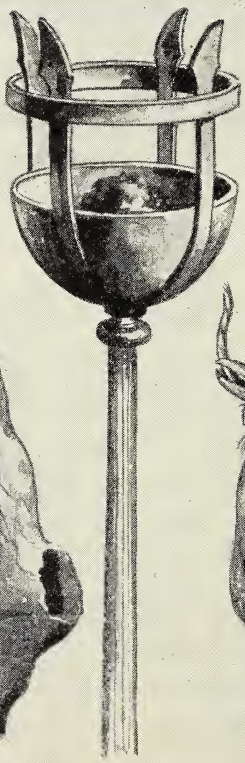
Above: Lamp to burn whale oil

Below: Old shell lamp to burn grease

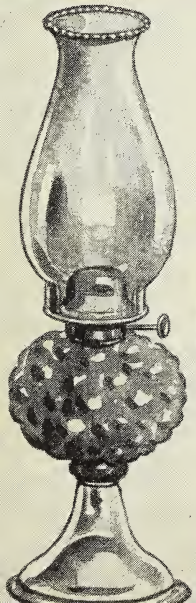


Below: Roman lamp using olive oil

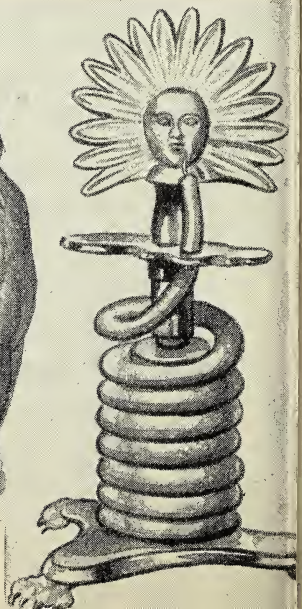
Below: Cresset to hold torch of burning materials

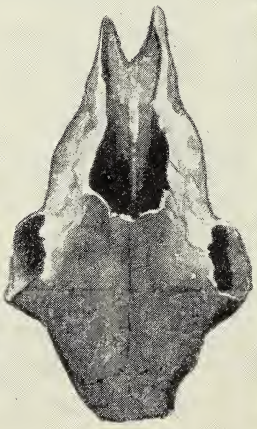


Below: An old-fashioned kerosene lamp



Below: A holder to burn a long, thin candle





At the left: A goat skull used as a lamp. Right: A candle bird

Kerosene could be used in lamps and for all purposes that coal oil could be used for. Some people called it coal oil, and even today, in some parts of the country, kerosene is still called coal oil.

The men who first made kerosene sold all they could make so easily that they looked for more places where petroleum could be found. Men began to drill wells for petroleum, and the first successful oil well was drilled in Pennsylvania. When oil was found there, hundreds of wells were drilled. Soon there was a big supply of petroleum.

The factories that made kerosene from petroleum were called refineries. The refineries made large quantities of kerosene, and people used it more and more in lamps and in stoves. But sometimes the kerosene exploded and many people were afraid to use it. Then the men working at the refineries discovered that kerosene would not easily explode if they first made gasoline from the petroleum, and then made kerosene from what was left of the petroleum. So the refineries began to make large amounts of gasoline and kerosene. No one wanted the gasoline; so the refineries tried to sell it for as little as one cent a gallon, or else gave it away.

For some time there was no way to use gasoline. Some refineries poured the gasoline into rivers in order to get rid of it. But this was dangerous, because the gasoline floated on the water and sometimes caught fire. Laws were passed forbidding the refineries to dump gasoline in the streams.

When the automobile was invented, however, the refineries had no trouble in selling their gasoline, because automobile engines used gasoline. More and more automobiles were sold and needed more and more gasoline. People were using less kerosene because they

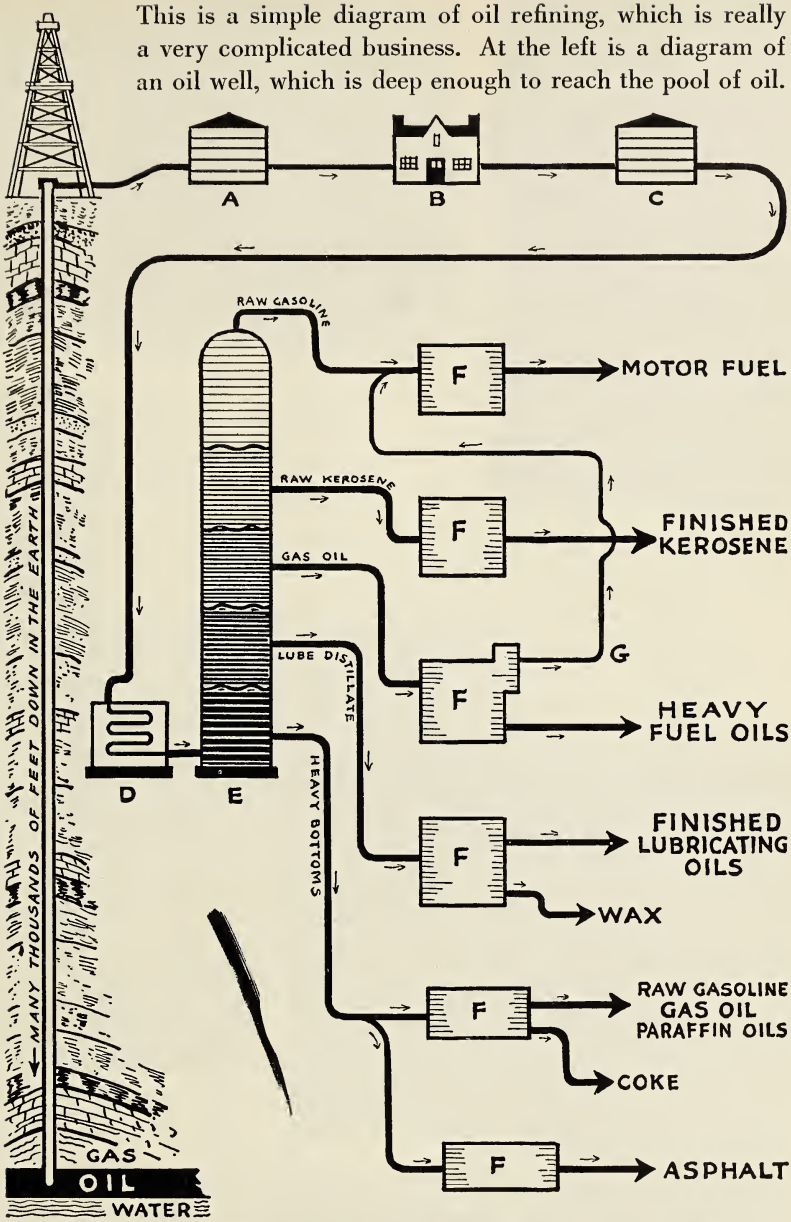
had found that gas made a better light. And then they found that electricity made an even better light. People used less kerosene in stoves because gas stoves were cleaner and more convenient. And so the men at the refineries looked for ways to make more gasoline and less kerosene from the petroleum. They were successful in discovering new ways, but they also had to invent new machinery to do it. Now, much more gasoline than kerosene is made.

Refineries make other things from petroleum besides kerosene and gasoline. Most of the oil used for automobiles and other machines is made from petroleum. Refineries also make the kinds of fuel that are used for Diesel engines, for oil burners that heat buildings, and for running many steamships. They also make waxes like paraffin, different kinds of grease, and some kinds of tar and asphalt that are used for pavements. Besides all these products, hundreds more are made from petroleum.

Because petroleum products are used for so many purposes, particularly in providing us with fuel for heating and for transportation, petroleum has become very important. Men have hunted for petroleum in many countries and have drilled wells in many distant regions where they thought petroleum could be found. The map on page 226 shows the places in the world where there are petroleum wells.

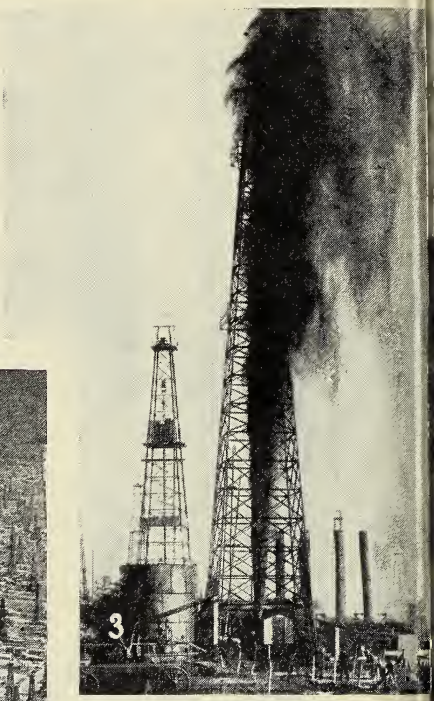
The next map shows the places in the United States where petroleum is produced and the places where oil refineries are located. Some of the wells are in regions where not much gasoline or oil is used. The petroleum must be sent to refineries, which are usually located near large cities where the petroleum products can be sold. A great deal of petroleum

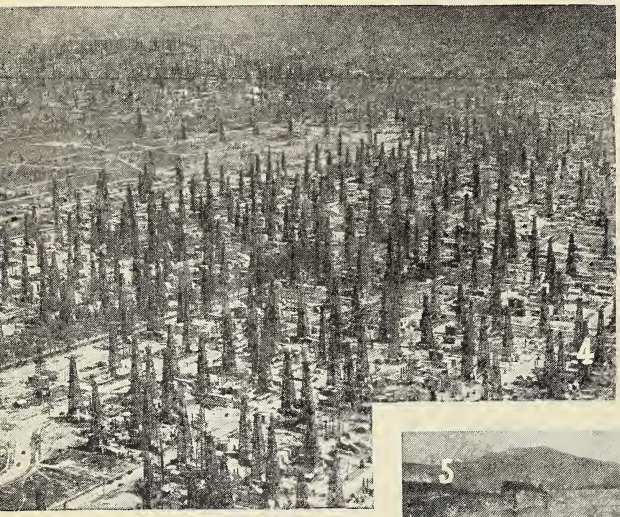
This is a simple diagram of oil refining, which is really a very complicated business. At the left is a diagram of an oil well, which is deep enough to reach the pool of oil.



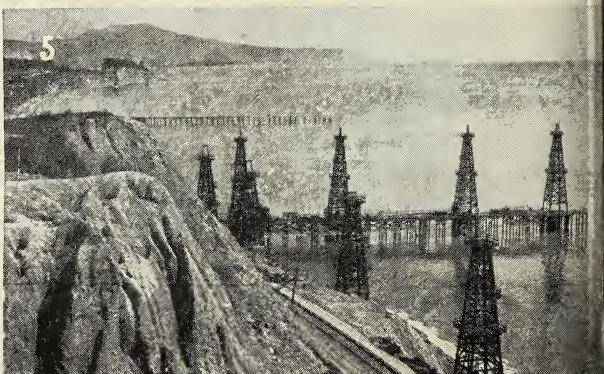
Letter "A" shows a storage tank at the well, "B" is a pumping station to force oil through the pipeline, "C" is a storage tank at the refinery. "D" is a still in which the oil is heated; "E" is a cooling tower where the different products are collected after being distilled. "F" marks the tanks where products are purified.

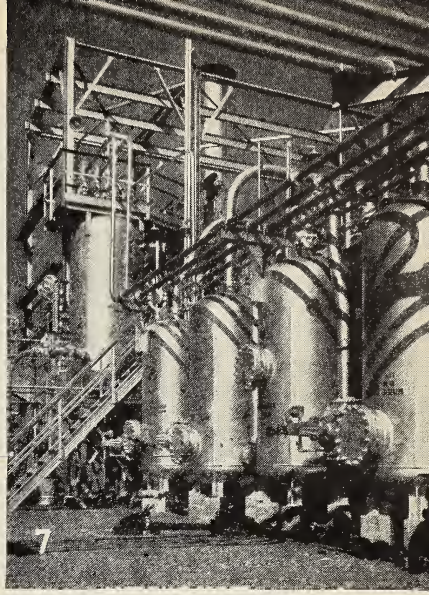
The men in Picture 1 are drilling a deep well for petroleum. This kind of drill goes round and round. Picture 2 shows machinery used for pumping oil from the well. Picture 3 shows a well, called a gusher, spouting oil.





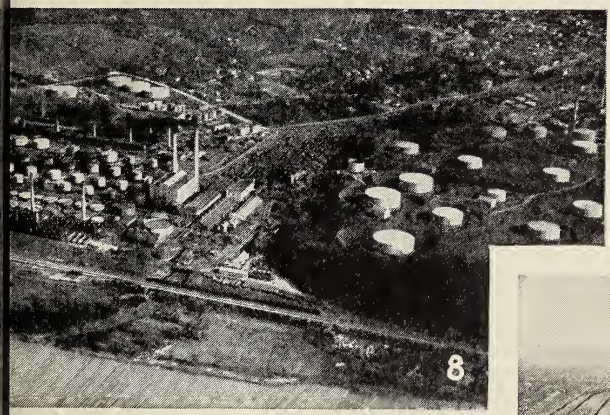
Picture 4 shows how close together oil wells are in some places. Picture 5 shows wells that were drilled to reach oil in rocks beneath the bed of the ocean.

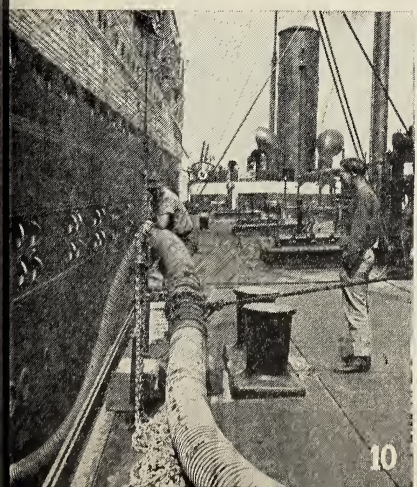




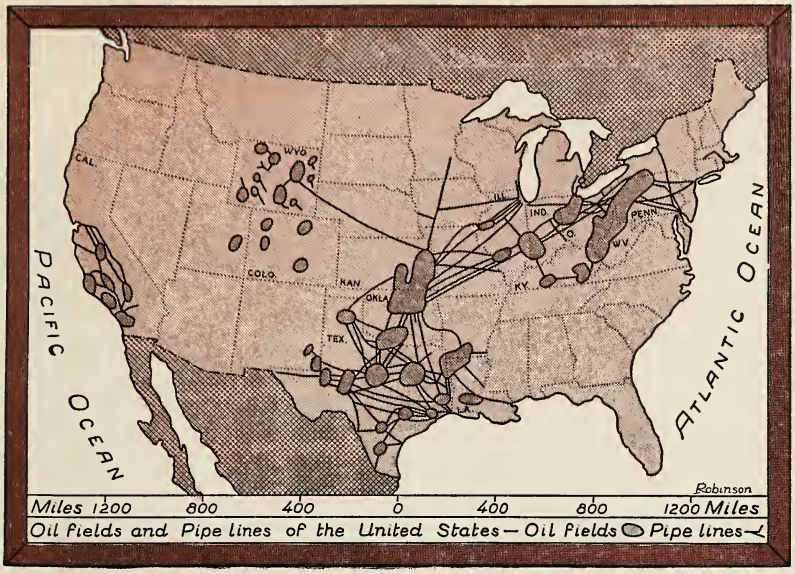
n Picture 6 are laying a pipe line to oil. Picture 7 shows the inside of the nery you see in Picture 8. Pictures 9 0 show two other ways, besides pipe that are used to move oil from place lace. Can you think of other ways?

Make an exhibit of pictures showing how people in the region where you live make use of petroleum and some petroleum products. Paste the pictures you find on large sheets of paper or cardboard. A group in the class might draw a frieze or a mural showing these uses.





Black spots represent the places in the world where oil wells are now producing petroleum.



On this map are the oil fields and the pipe lines of the United States. New pipe lines are being built and new wells are being drilled in many other places, but the important ones are shown here.

is sent to these cities through pipe lines. Large pipes, sometimes more than a foot in diameter, have been laid in the ground from the wells to the refineries. Pumps are used to move the oil through the pipes. There are thousands of miles of pipe lines in the United States. One pipe line is more than 1500 miles long. Pipe lines save loading the petroleum into tank cars and moving it by railroad and by truck.

Other Minerals from Wells

We get other valuable and useful minerals from wells. Most of the salt we use comes from wells, drilled deep into the earth. Water is used to dissolve the salt, which is usually found many hundreds of feet below the surface of the ground. Then the salty water is pumped out of the well, the water is evaporated, and the salt is left.

The picture above shows a salt factory near Great Salt Lake in Utah. Water from the lake is pumped over the fields. When the water evaporates, salt is left. Below is a picture of an enormous block of sulphur that came from a sulphur well in Texas.

Much of the sulphur we use also comes from deep wells. Hot steam is used to melt the sulphur so that it will flow out of the well. The melted sulphur is allowed to cool in blocks and is then shipped to concerns that make rubber goods, matches, chemicals, gunpowder, and other products.

The minerals mentioned in this chapter are some of the commonest minerals that men get from the earth. There are hundreds of other minerals that are useful in hundreds of different ways. Men who study such things are always experimenting, trying to find new materials to use and new ways to use the materials that we already have.

Making Minerals Useful

Long ago people in different parts of the world thought up stories to explain how fire and some of the important metals were discovered. This was so long ago that the stories became legends. The Greeks had myths about a blacksmith god they called Hephaestus. The Romans called him Vulcan. The Norse peoples had a blacksmith god, too. Your library will have some books that will contain legends about some of these gods. And these are not all. The legends of other countries and the myths of the American Indians also contain stories about fire and the discovery of metal. Perhap you can find and read some of them.

Legends are easy to make into short plays. Perhaps a group in the class would like to dramatize some legends. In preparing a play there is enough work to share with several groups. One group could write the play from the legend. Another could act it. Still another group might design the costumes. If you wished to do it elaborately, a fourth group might make scenery.

Look again on page 174 at the list of things you can do to make study interesting. You might select some of these things to help your study of mineral resources. The whole class can do two of the things together. In a class discussion you can quickly make a list of the minerals you need or use every day. You can discover where these minerals come from and mark the sources on your large United States map. And you can take the large map of your region and put little symbols on it to show the mineral resources. You can use such symbols as:

Petroleum

Coal

Iron

Clay

Building Stone

You can make up other symbols for other mineral resources if you think about it for a while.

If you decide on a trip, perhaps you can visit a mine, a quarry, a clay pit, or even a gravel pit in your neighborhood. Find out what becomes of the minerals, where they go and what they are used for. A good question to ask, when you are visiting this place, is how long the supply of minerals in that place will last.

A famous man once said that a forest was a *crop* of trees, not a place to *mine* lumber. He wanted people to realize one of the big differences between our plant resources and our mineral resources. You can show this difference by making an exhibit of (1) a stalk of wheat or other grain, (2) a piece of wood, and (3) a piece of coal. Fasten each of these to a piece of cardboard and write under each one the length of time it took to produce each. You can consult your encyclopedia for information about how long it takes to grow wheat, to grow a tree big enough to cut for lumber, and to produce coal. When the display is com-

plete, the class might have a discussion about the differences between plant and mineral resources and how these differences affect the way we use the resources.

In this chapter you read about two inventions that had a great deal to do with the amount of mineral resources we use. When the electric light was invented, people began to use less kerosene. When the automobile was invented, people began to use more gasoline. Other inventions have had an effect on the amount of minerals we use. You might have an interesting discussion in class about such inventions and the ways in which they changed our use of mineral resources. Write on the blackboard the list of inventions given below. Fill in the second list by writing opposite the invention the minerals that you decide were used either more ways, fewer ways, or in different ways as a result of the invention.

Invention	*Minerals*
Automobile	Petroleum, Steel, Glass
Electric Light	
Electric Wire	
Airplane	
Glass	
Canning of foods	
Bricks	
Railroads	
Steam Engine	

On pages 32, 78, and 79 are pictures of homes made of plant materials and of animal materials. By looking at the pictures you can tell something of the resources of the regions where these homes were built. Now look at the homes you see on pages 48, 128, and 195. From what you see in these pictures of homes, decide what materials were used for building. Discuss in class the reasons why people are likely to use the kinds of materials they find in the region where they live.

A lot of interesting ideas will come up in such a discussion. You will probably find that these materials have a great deal to do with the way people live. For example, if you lived in a mud hut with a dirt floor, you could build a fire for cooking right on the floor. But if you lived in a wooden house with a wooden floor, you couldn't do that; you would need some kind of fireplace.

If you have time, the class discussion can take up the ways in which the resources of your region affect the way you live. You will want to compare your region with other regions. Perhaps there are members of your class who know something about other regions. Or perhaps you can invite someone who has lived in a different part of the world to talk to your class.

The discovery of minerals has often affected the lives of many people. If you have read about the great gold rush to California in 1849 you know how excited many people became. Men flocked to California from distant parts of the world. Perhaps you can make a collection of pictures of this gold rush. Or your music teacher might teach you some of the popular songs of that time. You might also look up other "rushes" in history books and in your encyclopedias. There was a rush to the Klondike when gold was discovered there. There was a rush to Nevada when silver was discovered there. There have been rushes to Oklahoma when oil was found there, and to South Africa when diamonds were discovered.

The class should know something about coal, the way it is formed and how it is mined. Groups in the class might study coal and make reports to the class. Perhaps your state has a coal exhibit that is loaned to schools, or perhaps a nearby museum has one.

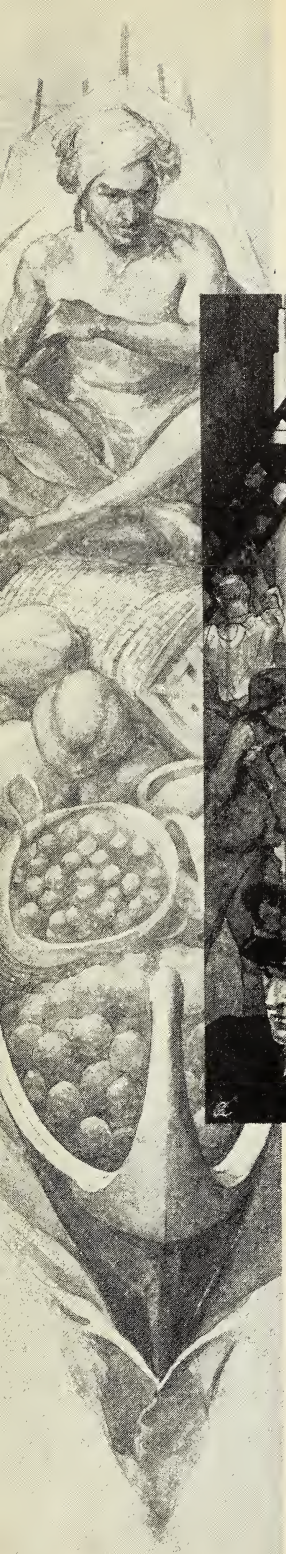
Your school or community library probably has a number of books of poetry. Some of them may be in-

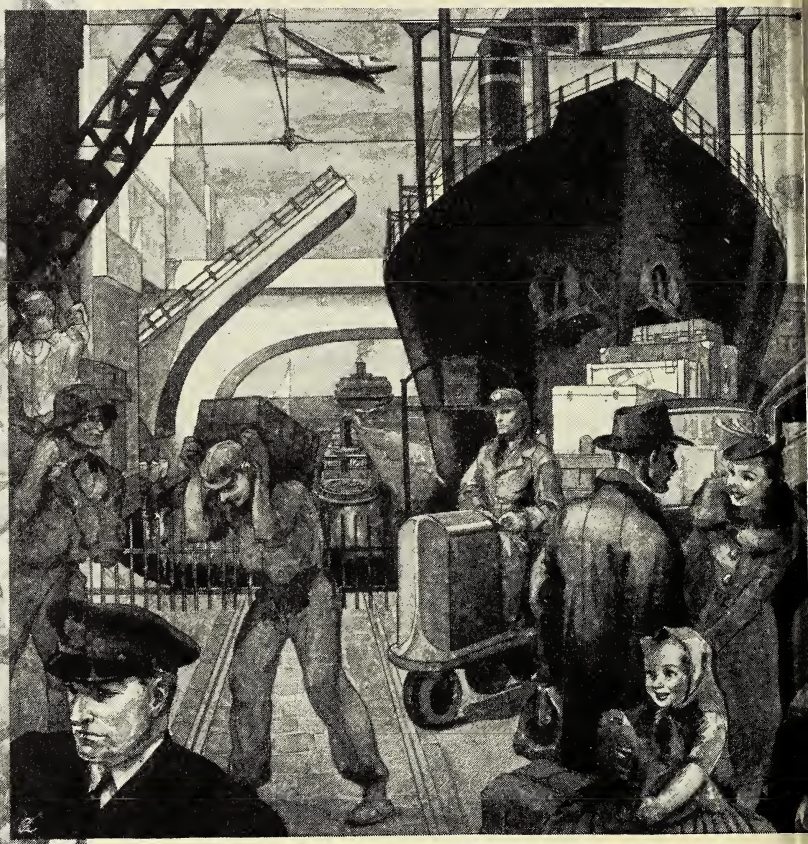
dexed so that you can look up poems about minerals and how they are used. You might read one of them in class. Or, if the poems suggest verses to you, you might make up some verses and read them. The verses could be about mining, quarrying, drilling, working with metals or rocks or oil—you can probably think of dozens of subjects.

It might help you to add the following words to your glossary after looking them up in your dictionary. Some of them are explained in the chapter in the places where they are first used.

ore	smelting	foundry
alloy	galvanized	kerosene
refinery	furnace	dyes
flint	gems	plaster
mortar	bronze	brass
solder		

CHAPTER SIX





THE TRADER

The things we see in most store windows have traveled a long way and passed through many hands.

Why People Trade

TODAY, when the herdsman of Lapland has more reindeer skins than he and his family can use, he takes some of the skins to town. Perhaps he also takes along some bone knife handles he has carved or some mittens his wife has embroidered. In the town he trades these articles for things his family wants, such as coffee or bright-colored yarn, or a sharp knife blade.

The Lapp and his family could get along without the coffee and without the bright yarn. They might even manage to get along without the knife blade, although that would be harder. But they want these things and want them more than they do the extra reindeer hides. They want them enough to go to the trouble of carving knife handles and making mittens for other people so that they may have something more to trade besides hides from their herd.

The herdsman of long ago and the farmer, too, traded what they had for things they needed and wanted. Probably the hunter traded, also. Each of

This African potter has his home and his workshop on the side of a hill where he can get plenty of clay for the bowls and jars that he makes and sells.

them needed and wanted things that he could not make or raise or find for himself, just as the Lapp of today wants coffee, bright yarn, and sharp knives—things that he cannot make or raise or find in his far northern home.

One good reason for such trading is that there are different kinds of materials in different places. The early people who lived near a quarry where fine flint could be found probably spent much time in chipping flint into tools and weapons. They could easily trade the things they made to people who had no flint. Those who lived near a bank of smooth fine clay would be able to make pottery and trade it for what they wanted. Men living in the great oak forests could gather plenty of bark for tanning leather.

It was much easier for men to take the materials found close at hand and exchange them for what they wanted than it would have been to search far and wide for the raw materials and then make what was needed. That is how business, which we call trade or commerce, began.

You have read about little farm villages that grew into towns and into cities because people came there to trade. Farmers brought in the grain or other farm products they did not need to keep for food or for seed and traded for some of the many things farmers want. Herdsmen brought in skins and wool and traded them for what they wanted. Hunters traded also—furs, game, or fish, for whatever they happened to need.

This kind of trading—exchanging one thing for another—is easy to understand if we forget about money for a moment. Suppose two boys have taken their lunches to school. Each has sandwiches and milk, but one of them also has a big apple, while the other has two cookies.

"I'll trade half my apple for one of your cookies," says the first boy.

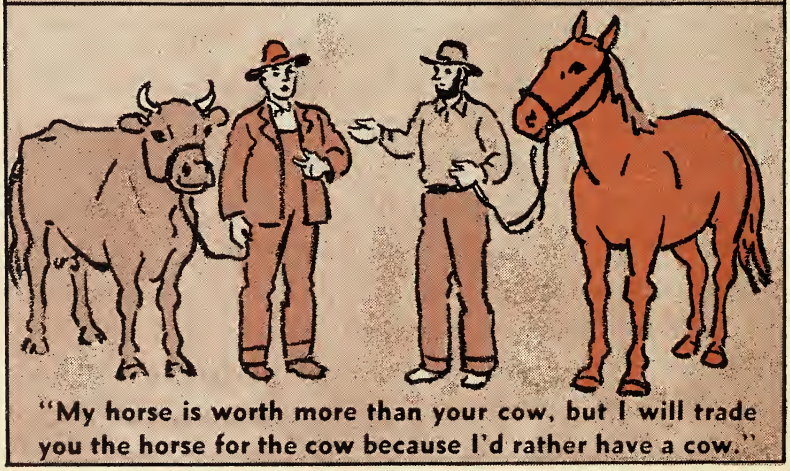
The other boy must make up his mind whether he wants half an apple more than he wants his second cooky. If he decides that he would rather have the apple than the cooky, the trade is made. You probably have made trades of that kind yourself.

Trading at the village market was not very different many, many years ago. The farmer with some extra grain might want a soft sheepskin. He might have to ask several herdsmen before he found one who was willing to take grain for the skin he had brought to market. But when the two men found each other, they could make a good trade.

"I'll trade you half my apple for one of your cookies."

"I'll trade you this violin for that old chair."

"I'll trade you these beautiful beads for just a little bit of that land over there."



"My horse is worth more than your cow, but I will trade you the horse for the cow because I'd rather have a cow."

For a long, long time people met and traded that way. It was not actually necessary for many of these people to trade, because they could make a living anyway. The herdsman did not have to have the grain, and the farmer did not have to have the sheepskin in order to go on living. But they wanted these things, and besides they probably had a good time on market days, meeting people and bargaining with them.

Making a Living by Trading

At some time or another, long, long ago, men got the idea that they could make a living just by trading. Perhaps one herdsman always made better trades at the market than others in his tribe. Those who had to stay and watch the herd and so could not go to market would ask that man to make their trades for them. They might even give him a present if he made an especially good trade. By and by the tribe might send this man here and there to different village markets, and in time he would stop his herding and spend all his time trading. That is one way that trading might have become a way of making a living, like farming or herding.

Men who have studied such things think that the earliest traders might also have started in business in villages where there were regular markets. It might have happened some thousands of years ago in some such way as this:

Den and his wife sat in the doorway of their hut in the village, watching the market-day crowds. Market was almost over, and the people were leaving so that they could get home before dark.

"Look at that herdsman from the hills," said Den. He pointed to a man who was walking up and down,

speaking first to one farmer and then to another. The herdsman from the hills was offering three sheepskins to each farmer.

"He must have come in late," said Den's wife. "See, he wants grain for his skins. It's too bad that every farmer who had grain has already traded it away or gone home."

"Has old Mel gone home?" asked Den. "He wanted some skins and didn't get any."

"Yes, he went home," said Den's wife. "But he will be back next market day and try again to get the skins."

Just then the man from the hills passed the hut. He looked over at Den and his wife and held up his sheepskins.

"Three skins, three fine sheepskins for two measures of grain, for two measures of grain," he called.

Den shook his head and the man went on.

"Old Mel would give a measure of grain for one skin," said Den. "That would be three measures of grain for three skins."

"We have two measures of grain in the house," said Den's wife. "Let us trade for the skins."

"Why should we trade?" asked Den. "We do not need three sheepskins. Besides, we are going to need the grain."

"But if we give two measures of grain to the herdsman, we will have three skins," said Den's wife. "Then the next market day we will see Old Mel and trade him the three skins for grain. He will give us three measures of grain."

"Well, but—" began Den.

"Don't you see?" cried his wife. "We will have our two measures back and an extra one as well, because

Old Mel will give a measure of grain for each skin. We will have a measure of grain we do not have now. Call the herder!"

Den called after the stranger, and after a few moments of bargaining the trade was made. But Den was not sure his wife was right until next market day, when he traded the skins to Old Mel for three measures of grain.

How Trading Helped People

And so, in some such way, traders began to do business in the villages of long ago. The trader really made it easier for people to trade. Before there were traders in villages, people had to come to town when other people were there on market days. But the trader had a store, or place of business, where people could come any time. The trader, or his wife, or someone in the family, was there all the time. The trader was willing to take almost anything in trade any time and was ready to trade anything he had.

Traders were useful for another reason. The man with hides who wanted grain did not have to waste time hunting up a man with grain who wanted hides. Instead he took his hides to a trader, and there he found the grain that some farmer had brought in. Thus the man could trade his hides for grain without ever seeing the man who raised the grain. It is certainly a good thing for us that we do not have to hunt up and trade with all the people who make or raise all the things we use.

Traders made trading easier for people in still another way. Suppose a fisherman went to market intending to trade his fish for some grain. He met a herdsman who wanted fish, but the herdsman had

The fisherman wants the leather, but the other man doesn't want a fish.

The farmer wants a fish, but the fisherman doesn't want grain.

The farmer doesn't want to trade his grain for the other man's leather.

The fisherman can get a piece of leather at a store in trade for his fish.

The farmer can trade his grain at the store for the fish he wants.

The herdsman can trade his leather at the store and get grain for it.

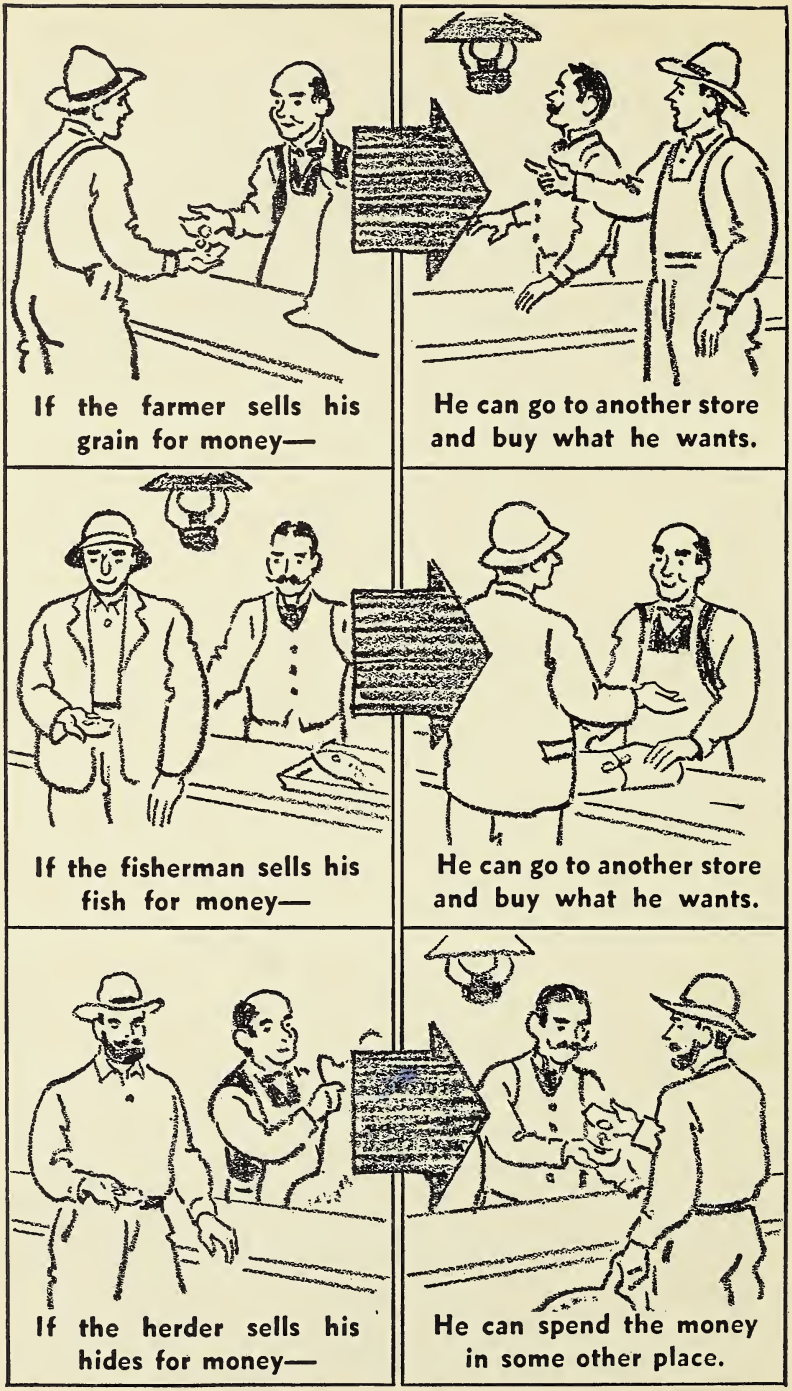
skins to trade, not grain. The fisherman didn't want skins, so he went on. Then he met a farmer who had grain, but the farmer wouldn't trade because he didn't want fish. The farmer wanted skins.

If the farmer met the herdsman, they couldn't make a trade either, because the herdsman didn't want grain. There could not be a trade unless all three men got together. But if they went to a trader's store, the trader would take each man's goods and give him what he wanted in trade.

Money was invented, perhaps by traders, to make trading easier. Trading by exchanging goods can become very complicated. The trader to whom the fisherman, the herdsman, and the farmer went would have to figure how much grain to give for fish, how many fish to give for a skin, and how many skins to give for grain. He would also have to figure how to make a profit for himself on each trade. How much easier for him to figure what each thing was worth in money!

Why Money Is Useful in Trading

MONEY is very useful in buying and selling. Suppose the trader did not have the grain the fisherman wanted. If the fisherman left his fish with the trader, then the trader could give the fisherman something to show that when he came back he would get a certain amount of grain. He might give him a shell, a little piece of silver, or perhaps several pieces of copper. Whatever he gave, we would call it money. Probably it wasn't thought of as money then. People thought of it as something they could take back to the trader who would exchange it for goods. When the trader got a reputation for honest dealing, everyone would take the things he used as money.

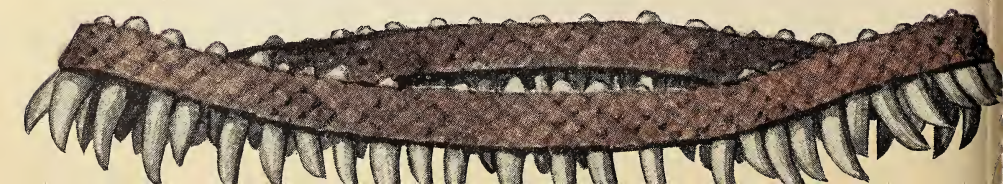

If the farmer sells his grain for money—
He can go to another store and buy what he wants.
If the fisherman sells his fish for money—
He can go to another store and buy what he wants.
If the herder sells his hides for money—
He can spend the money in some other place.

Many different things have been used for money. The Chinese once used a kind of wooden money. If a man bought five ducks, the buyer and the seller would take a little stick of wood, cut five notches in each end, and break the stick in the middle. Each man would keep half. When five ducks, or something worth five ducks, were brought back, the pieces of stick were fitted together and the debt was considered paid.

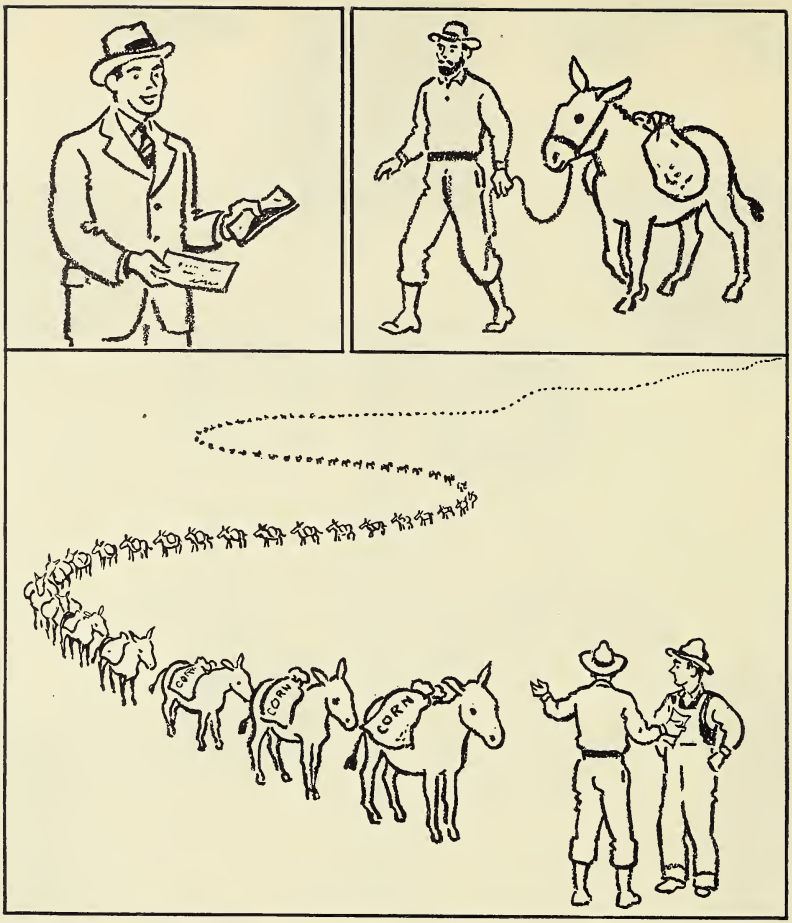
The North American Indians used beads for money. The beads were very carefully made from shells and were called wampum. Indians often exchanged presents; perhaps we would call it trading. If an Indian had no present to give to another Indian, he would hand over some wampum, the amount depending upon the value of the present he had received. That would mean he owed the second Indian a present. When he gave the present, he got the wampum back. Or if the second Indian sent back the wampum, the first one had to send him the present. No matter what is used, the giving of money means that something has been received. Money can be exchanged later for something the owner wants.

The early Romans used bars of copper for money. Some bars were stamped with the figure of an ox to show that it stood for the value of an ox. Among early settlers in America, tobacco and beaver skins were often used for money. And so pieces of iron, cloth, leather, copper wire, shells, and hundreds of other things have been used for money in different parts of the world. Some trinkets and beads worth about $24.00 were once traded by white men to the Indians for the island of Manhattan, where New York City now stands. That was one of the biggest and most unfair trades ever made.

All the different articles on these two pages were once used as money somewhere in the world. There are hatchets and knives, pieces of metal, beads, shells, animal teeth and skins, paper, stone, wire, tobacco, and other things.



A class group might look up money in the encyclopedia and explain some of these pictures to the class.



These pictures show one reason why money is useful. A man who wanted to buy a farm could carry the price of the farm in his pocket if he used paper money or if he used checks for money. If he used gold for money, the gold would be too heavy for one man to carry. A donkey could carry enough gold to buy a small farm. But if the man used corn for money, he would need several thousand donkeys to carry the price of the farm.

Gold is a useful metal for money because it will keep without rusting or quickly wearing away and does not take up much room. It can be made into ornaments which are always worth as much as the gold in them. In India the people pound their gold and silver

money into jewelry and save it that way. For these reasons gold has been used in many places, for many centuries, as money. Silver and copper have long been used as money, too.

The use of gold and silver money made it easier to carry on business. Its use often made trouble, however, because a man could carry in his purse enough money to buy a farm. Thieves could steal the purse easier than they could steal a farm. Because money could be carried easily, a trader could make long journeys after more business. He did not need to burden himself with a bulky load of goods to pay for things he wanted.

Traders usually carried the most salable goods they could find. For example, a trader would go to a mining village with a load of grain, cheese, wool, and other things the miners did not have. He would trade these products for iron, tin, copper, or whatever metal the miners got from the ground. He knew that his trip would be profitable, because he could sell the metals or trade them for goods or for still more products of the farm and the herd when he got back to his village.

Some Traders Became Explorers

THE EARLY traders were really the explorers of their time. In trying to find new markets, they must often have made long, dangerous journeys into strange regions. For example, amber beads have been found in the ruins of Troy. We know that the amber came from the shores of the Baltic or the North Sea. How then did it get to this faraway city in the eastern Mediterranean world? Perhaps the people who found the amber traded it to another tribe which traded it

with still another tribe. Then perhaps it came into the hands of a trader. Maybe he traded it again or maybe he carried it all the way to Troy. And it is quite possible that some daring trader traveled all the way from the Mediterranean Sea to the Baltic Sea and traded directly with the people that found the amber.

Boats Were Useful in Trading

EARLY traders traveled by water as well as by land. Many of the early cities were on rivers that led down to the sea. And many cities were on the sea coast itself.

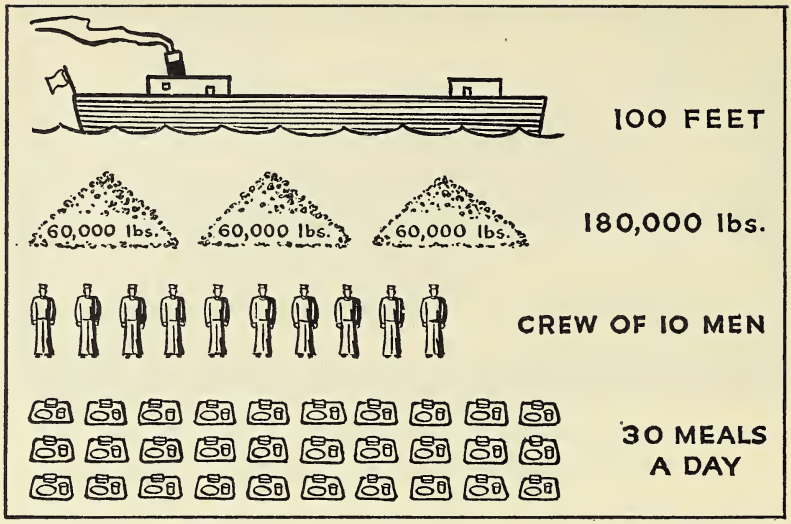
The earliest boat was probably only a floating log. But as you know, men gradually learned to make boats in many parts of the world. Eskimos made boats of skins: Indians made them of hollowed logs or of bark. Have you read about the bark canoe of Hiawatha, which floated "on the river like a yellow leaf in autumn"? Some people in Asia made boats of bamboo fastened together with ropes. Many thousands of years ago people who lived on the shores of the Mediterranean Sea learned how to cut boards and fasten them together into boats.

The earliest boats were small and were moved by men pushing with poles or working at oars. Then men learned how to spread great sails of cloth and move the boats with the power of the wind. But ships were still equipped with oars for use on days when the wind died down and the sails hung limp. Some of the ships built were very large. In the days of the Roman Emperor Augustus a certain ship sailed from Egypt to Rome. Besides a very large stone monument weighing many tons, it also carried a crew of two hundred, twelve hundred passengers, and 400,000

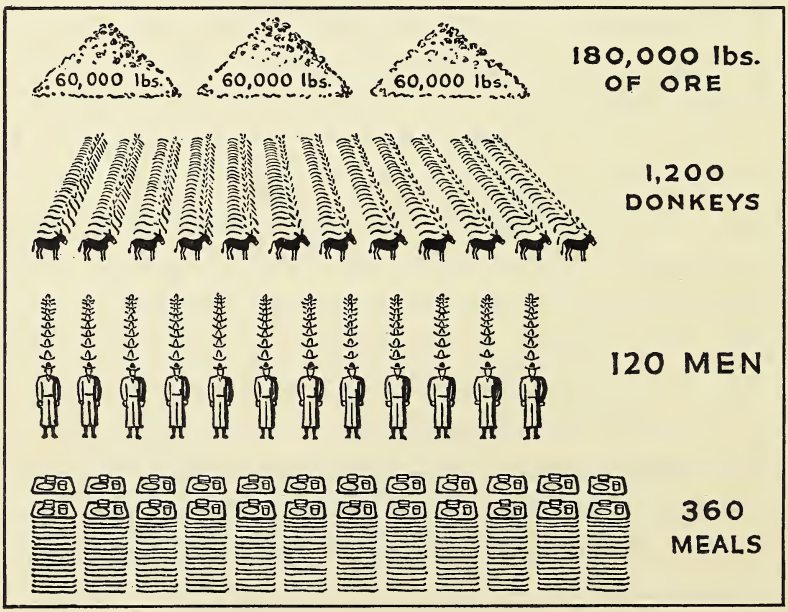
You might compare this map with the one on page 148 and find out what ships carried from one seaport to another.

bushels of wheat, as well as a cargo of linen, glass, paper, and pepper. Even a small ship could carry more goods than a hundred camels, donkeys, or pack horses could carry, and only a few men were needed to run the ship. Moving goods by water has always been much cheaper than moving goods by land. The pictures on the next page show some reasons for this.

You can see, from the map on this page, why the Mediterranean Sea was such an important waterway in early times. Many people lived around its shores, in cities and towns and in farming villages. There was trade between these cities and towns and peoples. For instance, before Rome was founded, Greek ships sailed to Italy, and Greek merchants traded metal work, cloth, and pottery to the farmers and herdsmen for oxen and grain. Some of these early traders did not find the Mediterranean large enough for them. Phoenician sailors, as you have already read, sailed the length of the Mediterranean, out into the Atlantic Ocean, and north to Britain, in order to bring back tin to Mediterranean lands.



These pictures show you some reasons why ships can carry things cheaply. A ship 100 feet long can carry about 180,000 pounds of ore. Ten men can take care of, and run, such a ship. These men will need 30 meals a day. Now look at the pictures and see how many donkeys would be needed to carry the same amount of cargo, and how many men and meals would be needed. Can you think of any other reasons why ships can carry goods cheaply?



The Phoenicians were more than clever navigators. They were also manufacturers of fine glass and porcelain ware, linen, metal articles, and many other things that they used in trading. The Twenty-Seventh Chapter of Ezekiel gives a list of the articles that might have been seen on a visit to the chief city of the Phoenicians. Among the metal goods were articles of silver, iron, lead, tin, and copper. Ships sailed into harbor with cargoes of furs, dried fish, ivory, marble, and rare woods. King Solomon's ships, which were sailed by Phoenicians, brought in among other things "gold and silver and ivory and apes and peacocks."

In Roman times trading was usually safe, because Roman soldiers kept the lands peaceful and prevented robbers from stealing goods. When the Romans became interested in ships, they cleared pirates out of the Mediterranean. The Romans not only used ships for trading along the shores of the Mediterranean, but they also built a great network of roads which connected their cities with each other and with Rome. There was an old saying that all roads led to Rome. The roads were built so that the Romans could communicate quickly with any part of their empire and send troops and supplies wherever they were needed. The roads also helped traders to transport their goods.

Trade with the Far East

TRADING was also carried on in other parts of the world besides the region around the Mediterranean. The people of the Far East, in China and India particularly, had many clever craftsmen. They had gold, silver, precious stones, and other rich resources. They knew how to make porcelain—beautiful white pottery—and they could spin and weave expensive cloth of

cotton and silk. They made paper and perfumes and grew spices and drugs.

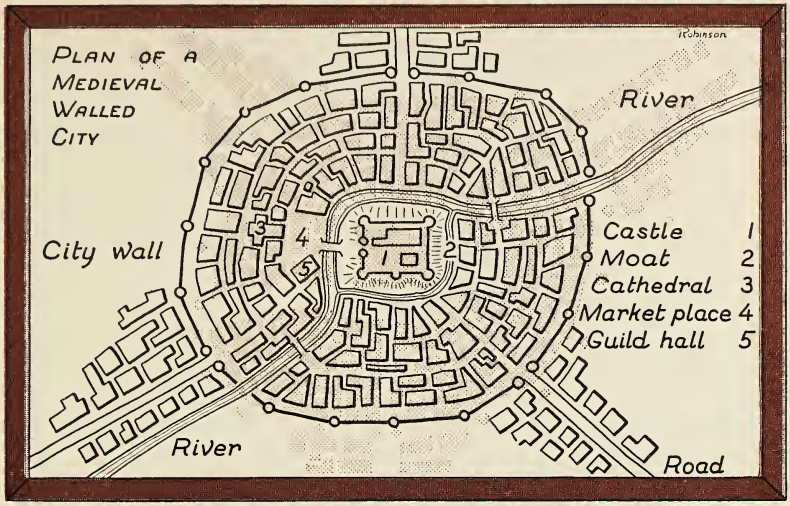
These things from Asia were prized by the people of Europe. They were costly, however, because they had to come to ports on the Mediterranean all the way across the desert lands of Asia on the backs of camels or be brought by ship into the Red Sea and then carried the rest of the way by camels or donkeys. Then the goods had to be loaded on Mediterranean ships and be taken to Europe. In fact, it took about four years for goods to come by land from China, and the trader had to pay not only the freight but many tolls and fees. All of these costs were, of course, added to the price of the goods.

In the Middle Ages, cloves were well worth their weight in gold. If we had to pay for cloves at that rate today, we would pay over $50.00 for a package that costs only ten cents at the grocery. Only a rich trader could buy enough goods to load a caravan with silks and spices and pay the men who took it across the many miles between the trading centers of Asia and the cities and towns of Europe.

Towns Became Trading Places

For a long time during the Middle Ages there were only a few cities and towns in Europe. The many little farming villages about which you have read were really just clusters of huts for the serfs who were the farm workers. Here and there, however, towns were growing into cities and it was the traders and merchants who helped them to grow.

Of course, some communities did not grow but remained villages. The ones which grew usually became important because they had a good location for



This plan shows what many cities were like during the Middle Ages. There were buildings along the roads leading to the city, but the safest place to live and work was inside the city wall. The castle, with its high walls and canal, or moat, around it, was the safest place of all. There was almost certain to be a market place, a guild hall, and a cathedral or large church nearby.

trade. Some of these towns were on rivers that carried a lot of traffic. Others were on the shores of the ocean at protected places where ships could anchor safely. Some were located at important crossroads or in mountain gaps through which traders passed on their way to other cities and towns.

In all these towns traders stopped to buy and sell goods. Villages in regions where good crops were raised and the people had plenty to trade with were fine places for traders to settle in. Since the land around each village belonged to the lord who owned the farms and the village and the castle, traders had to get his permission before they could settle in a village.

Usually the lord was willing to let traders settle on his land, because he could collect taxes from them.

Besides, more people would then come to the village to trade and craftsmen and other workers might want to settle there. All this would make the lord's land more valuable. And then, too, the trader might bring in fine goods which the lord might like to have.

The traders wanted protection for themselves and for their goods. Usually they did not care to live in the village with the serfs, so they got permission from the lord to build their homes close to the castle. Then they put up thick walls around their buildings. This walled place was called a burg, or borough, and was the beginning of a town. The traders who lived there were called burghers. Unlike the serfs, the burghers were all free men.

The lord did not care to have the expense of protecting the burg with his own soldiers and was usually glad to let the burghers hire their own guards and watchmen. He also let the burghers make their own rules about the hours for opening and closing the gates of the burg and for using water and building and putting out fires. Thus the burghers became responsible for keeping the burg peaceful and safe. They were the most important persons in the town, and they usually ruled it.

The burghers of the Middle Ages were glad to have their towns grow. All traders, or merchants, as we can call them now they have settled down, know that more people mean more business for them. The burghers let runaway serfs settle in the town, because they needed laborers and such people could be hired cheaply. In fact, a runaway serf who could hide in a town "for a year and a day" without being found by those hunting for him became free. But the merchants did not let every newcomer settle in town.

This picture was made from a drawing several hundred years old. It shows a watchman ringing the curfew bell to warn the people that it is time to put out their lights and cover up their fires. Because of the danger from fire in cities full of wooden buildings, city dwellers in the Middle Ages were not allowed to have a light or a fire after nine or ten o'clock at night.

Nowadays, when people move into a town and live there, they are considered citizens of that town. No one tells them whether or not they can move in or says that they must own property or spend a certain amount of money. But becoming a citizen of a town was not so simple in the Middle Ages. The merchants often decided who could live inside the walls of the town and who had to stay outside. Often the newcomer had to pay a fee or buy a piece of property in the town before he could become a citizen. Because

of the heavy taxes the merchants had to pay the lord, they did not want any new citizens who were not rich enough to own property and pay their share of taxes.

The man who became a citizen of the burg had to agree to keep the town laws. If he was called on, he had to act as a constable, or policeman, and he had to promise to fight for the town if it was attacked.

Men were proud to be citizens of a burg and looked down on those who were not. People who came from other towns, even if they spoke the same language and had the same customs, were looked on as foreigners. Moreover, citizens had privileges that other people did not have, such as grazing their animals on the town pasture. If the town was on a river, they could fish in the stream and use the town ferries. If a citizen was accused of breaking a law, his trial would be held in the town court. He would be tried by his fellow citizens, not by the lord. Best of all, he could always buy food and clothing and other things at fair prices in the merchants' shops.

How the Merchants Joined Together

THE MERCHANTS had rules about the prices and the quality of goods that were sold in the town. They also had rules about how many merchants and traders would be allowed to have stores in the town. You can see that these smart merchants understood the dangers of too much competition. Often they decided what weights and measures should be used. In fact, the merchants did many of the things that our city and state governments do for us today. They were able to do all these things because they had banded together in a kind of club or society called a guild. In the Middle Ages most towns had these guilds, or societies.

Merchant guilds of different towns often coöperated because a great deal of trade was carried on between towns. For instance, one town would be famous for its woolen goods, another for pottery, and still another for iron wares.

Fairs of the Middle Ages

THERE was also trade between the towns of Europe and faraway places. Much of this trading was carried on at the great fairs which were held at certain towns once or twice a year. To these fairs came traders from all parts of Europe and even from Asia, offering for sale a great variety of goods. For instance, in 1318, the traders of Venice sent five ships to the annual fair at Bruges. The ships were filled with fine goods from Italy and also from different parts of Asia and Africa

The towns shown on this map were noted for the fairs that were held every year. Most of these cities and towns were in the parts of Europe that are called Western Europe and Central Europe. But there were also fair towns in other parts of the world.

—spices, furs, and yards of beautiful and expensive silks and cloth of gold. When these ships headed back to Venice after the fair, they were loaded with timber, metals, hides, and other raw materials.

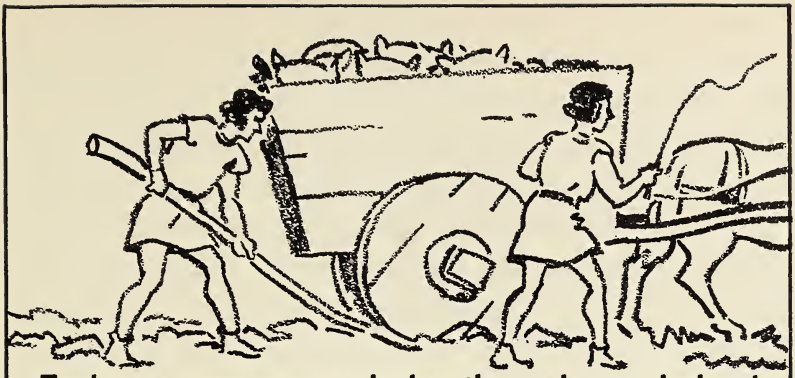
We have great fairs in our country today, but they are different from those of the Middle Ages. In our fairs various products are exhibited to show what people have made or raised, but usually the things exhibited are not for sale. Perhaps you have gone to a state or county fair and seen the fine farm products and animals exhibited there.

Difficulties of the Merchants

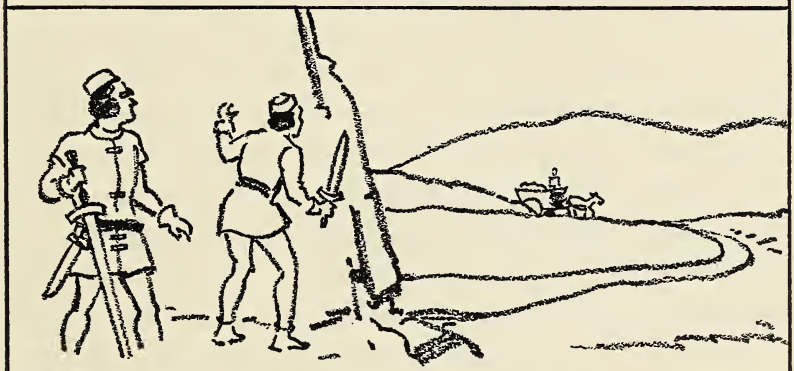
THE TRADE routes the merchants used were not at all safe, because of robbers who often attacked caravans and pack trains. Almost all the roads were poor ones, because it was really no one's business to build them and take care of them. Most of the roads were narrow, full of deep holes and ruts, and so muddy after a rain that travel was slow and sometimes impossible.

Travel on the rivers was a little easier than travel by land, but no one kept the rivers open for traffic. Fallen trees lodged in shallow places; mud and sand often piled up.

Merchants had other difficulties to face besides danger from robbers and the delays caused by poor transportation. Most of the lords collected taxes from every merchant who passed through his estates. Such a tax was called a toll. Often a lord would take goods from the merchant instead of making him pay money. Some lords did not bother to collect a toll. They just sent out their armed soldiers to take from the merchants whatever they wanted in the way of goods and money.



Trade was never very good when the roads were bad and people had a hard time getting to market.



Trade wasn't very good in places where robbers could stop people going to market and rob them.

And trade was never as good as it might be when people were puzzled about the kinds of measures and the kinds of money other people used.

The nobles living along the Rhine River robbed so many traders and other travelers, that they were known as "robber barons."

Of course, merchants had to charge enough when they sold their goods to get back the money they had paid in tolls and other taxes and to pay for their losses. They also had to get back the money they paid the men who made a living driving pack animals or running boats. And of course they had to make a profit. All this made goods very expensive.

Expensive goods were hard to sell in the Middle Ages, for only a few people had money enough to buy high-priced articles. That is one of the reasons why the guilds made their members charge fair prices. Some merchants looked for ways to sell goods cheaper so that more people could buy them. They realized that better and faster ways of getting goods from one town to another would be one way they could make goods cheaper.

Some of the merchant guilds which shipped goods by boat found a way to make their shipments faster and safer and cheaper. They got together and raised a large sum of money. Then the guilds went to the lords who had been charging tolls for every river boat that passed by or through their lands. The guilds offered each lord a large sum of money if he would agree not to collect tolls any more. Most of the lords were always in need of money and were glad to agree. The guilds themselves then began to charge a toll on all the boats, but they used the money to keep the river channels clear and to build docks and warehouses and improve harbors along the river. Goods moved faster, and merchants spent less money to send them from town to town.

There was not much the merchant guilds could do about getting the good roads that were needed. The roads passed through the lands of many lords, and each collected a toll from the merchants. Naturally the merchants began to think that they would be better off if there were fewer lords to collect tolls. In fact, if there were only one powerful lord in each country, then there would be only one toll to pay. That was something the merchant was in favor of!

As time went on, the merchants helped the lords who became kings in the different countries. Merchants knew that kings would take money from them in taxes, but they thought that a good strong government would be worth what it cost. Such a government could build bridges and keep the roads in good condition. It could arrest and punish robbers and thieves and keep the roads safe. It could say how much made a pound and how much a yard and punish persons who did not trade honestly, and it could coin money that everyone would be willing to take.

Money gave the merchants in the Middle Ages much trouble. Many lords made their own money, and that meant that there were many different kinds of coins in a country, each kind having a different value. That made it hard for merchants always to mark their prices and to make change. The merchant who sold goods in northern France would have difficulty anywhere else in France in getting people to take the money he had received. Many lords were dishonest and did not have the right amount of gold or silver put in their coins. That lessened the value of the money. What the merchants needed badly was money that was worth the same in each part of the country and that would not change in value from time to time.

The pictures on these two pages show markets of different kinds. The pictures on the opposite page were taken in the United States. Those on this page were taken in other countries. Picture 1 shows a market in South America where people come to buy food. Picture 2 shows a market in Mexico where Indians bring things they have made to sell. Picture 3 shows a fish market in Belgium, and Picture 4 shows a river market in the Malay Peninsula where the people come in boats and trade. Picture 5 is of a roadside market. Perhaps you have seen ones like it. Picture 6 shows a street market in New York City. Picture 7 is a wholesale vegetable market. Picture 8 is another kind of roadside market. The man who runs this market does not have a building, but uses his truck and the roadside as his store.

Most of the things offered for sale or for trade in these markets did not come from very far away. The customers did not come from very far away, either.

Have a discussion in class about the changes that would be made in your life if you could buy only such things as are sold at markets like those you see on these two pages. You will need to make two lists of your needs before you can hold a good discussion in class. The first list will be "Needs which can be satisfied with things made or grown in our region." The other list will be "Needs which can be satisfied only by bringing in things from other regions."

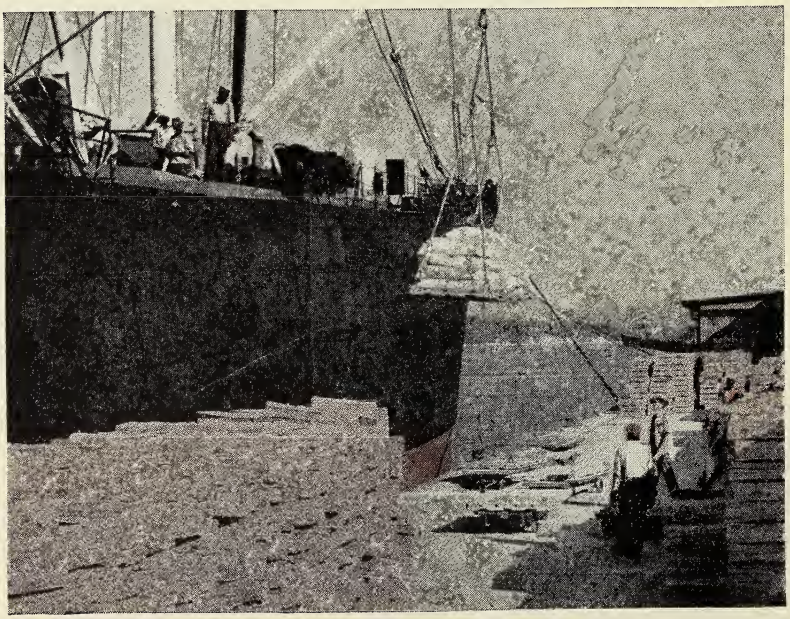
In the discussion, one of you might argue that we should trade only with our own region. Another might say we should trade only with regions in the United States. Others might say we should trade with both Americas, and still others, with the world.

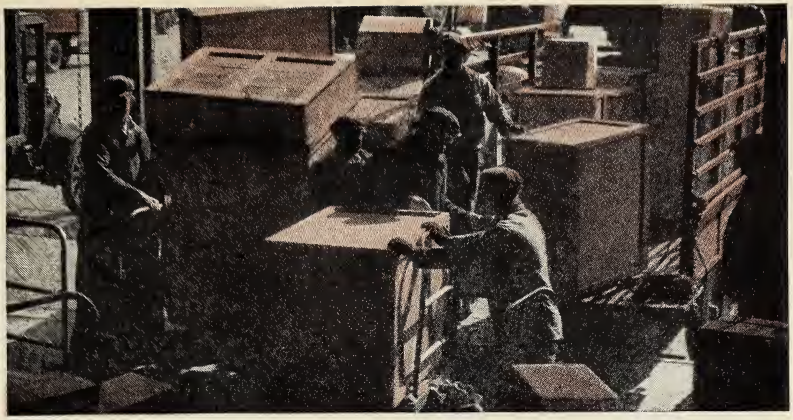
What you have read in these pages is only a small part of the story of merchants and traders. But it is enough to show that they are very important in helping us use the resources of the world. And everything we use for transportation and communication helps us to move goods from place to place and thus exchange the raw materials and the manufactured goods of different parts of the world. The steamships and railways, oceans and canals, rivers and docks, freight cars and trucks, telegraph and telephone lines—every one of these things helps to make resources useful.

What Trading Is

WE MIGHT say that trading (or you can call it business or commerce, if you like) is a way to make things even, so that people who have too much of one

On this wharf are piles of bundled shingles that were made in a mill nearby. The steamer is unloading flour at the same wharf. After the flour is unloaded, the steamer will load the shingles.



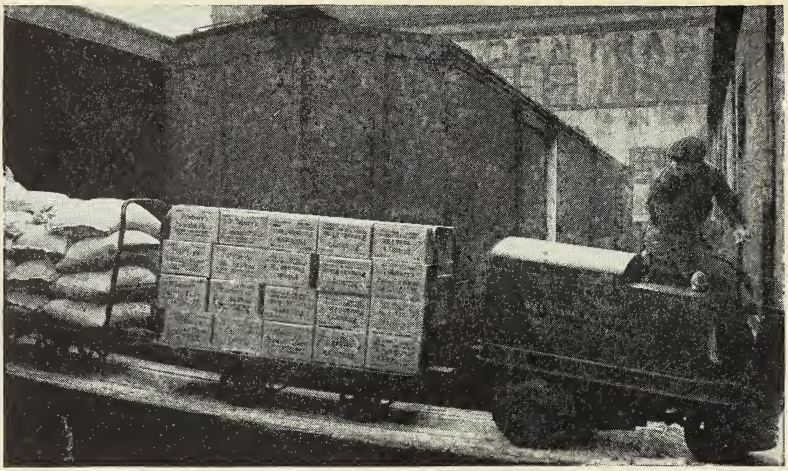


These men are at work in a railroad freight house. They are handling freight that is leaving their city. At another freight house men are also at work handling freight that is coming into the city.

thing can exchange a part of it for things they want and need. Trading is a way of getting something you cannot make or raise or find. It is the way a Brazilian gets from the United States some machinery that is not made in Brazil. It is the way we in our country get from Brazil coffee that we cannot grow in the United States.

Transportation and Communication

COMMERCE means moving goods and materials from one place to another. We call this shipping, or transportation. Getting word from one place to another is almost as important. We call that communication. These two things, transportation and communication, are important in trading and supplying our wants. Without them we would not be able to move materials from one part of the world into another part of the world where they can be used. We could not get coffee from South America if we did not have some way of communicating with the coffee planter



This man with the electric truck is hauling two trailers loaded with flour. The flour was ground in a mill in Minneapolis. Perhaps it will be loaded into a freight car and sent to Pittsburgh.

to let him know we wanted it. He could not ship the coffee to us if we did not have steamers and railroads to bring it to us.

Trade Routes of Yesterday and Today

THE TRADE routes of today are the railways, the highways, the waterways, and the airways. We could say that all of them are highways for trade. Traders and their goods move along these highways of today much more quickly and easily than traders and their goods moved along the highways and trails of long ago.

Many of the world's roads started out as animal trails. Animals usually find the easiest and safest way across country, and their trails are never very far from drinking water. The early hunters and herdsmen learned to follow such trails.

At first men carried on their backs or their heads whatever goods were moved. Now and then one sees

today a peddler with a pack on his back. Later, after they had tamed animals, they trained some of these animals to carry loads. Even today pack animals are used in deserts and very rough country.

When traders began traveling long distances, it was natural that the owners of pack animals should be hired to transport goods from one city to another. To protect themselves against robbers, these carriers of goods usually traveled together. A number of pack animals, such as camels or donkeys, was called a caravan, or pack train. Some of the caravans were more than a mile long. These caravans traveled from town to town, from city to city, and from one country to another, carrying goods the traders bought and sold.

The first roads often were animal trails that were used by men. Indian hunters made such trails in many parts of America. These trails had to avoid big rocks and fallen trees.

When white traders used the Indian trails and the trails made by animals, the paths were gradually widened. Men chose the easiest way to cross mountains and plains and to get from place to place.

Trade Follows the Highways

GRADUALLY the routes that the caravans took became highways of travel as more and more people used them. Wherever possible, routes followed level ground, because it is hard work to haul loads uphill. Sometimes it is not possible to go around mountains. For example, the Alps make a lofty wall, a mountain barrier between central Europe and Italy. But traders and other travelers found gateways, or passes, through the Alps. These passes are valleys which cut through the mountains. Sometimes passes are high and hard to climb, but it is always easier to follow them than to climb over the tops of the mountains themselves. One of the most famous passes through the Alps is the Bren-

These maps show how the mountain ranges in Europe and in America are like barriers to transportation. The chief passes through the mountains are shown. Sometimes these passes are called "gaps" and sometimes "gates." Roads that cross the mountains must go through these passes or else be built across or through the mountains at great labor and expense. A group in the class might collect some railroad folders that contain pictures of tunnels and bridges.

ner Pass, which leads from Italy into Austria. From very early times it has been a great trade route.

In our country the early settlers found the Appalachian Mountains such a strong barrier that it was

Roads through the mountains must follow the easiest slopes. They go through gaps or passes in the mountains whenever possible, because that is easier than to go around or over.

many years before they tried to cross this high "green wall" and make their homes in the rich lands beyond. One of the passes used by many settlers was Cumberland Gap, which cuts through the mountains at the place where Virginia, Tennessee, and Kentucky meet. Through this gap ran the famous Wilderness Trail, which Daniel Boone blazed by notching the trees.

Another pass in the Appalachians led into the western part of New York State. This was the Mohawk River valley, a route which became very important to trade partly because of the Erie Canal, which followed the valley, and later because of the railways which follow this easy route through the mountains.

There are few roads across deserts, because deserts are barriers to trade routes. Perhaps you can think of some reasons.

Mountains are a barrier not only to trade and travel but also to the spreading of ideas. People who live in mountainous regions are more or less shut off from the outside world and from each other, because travel is so difficult. Besides, they do not have many ways to make a living or many cities where they can sell their products. For that reason they are often poor.

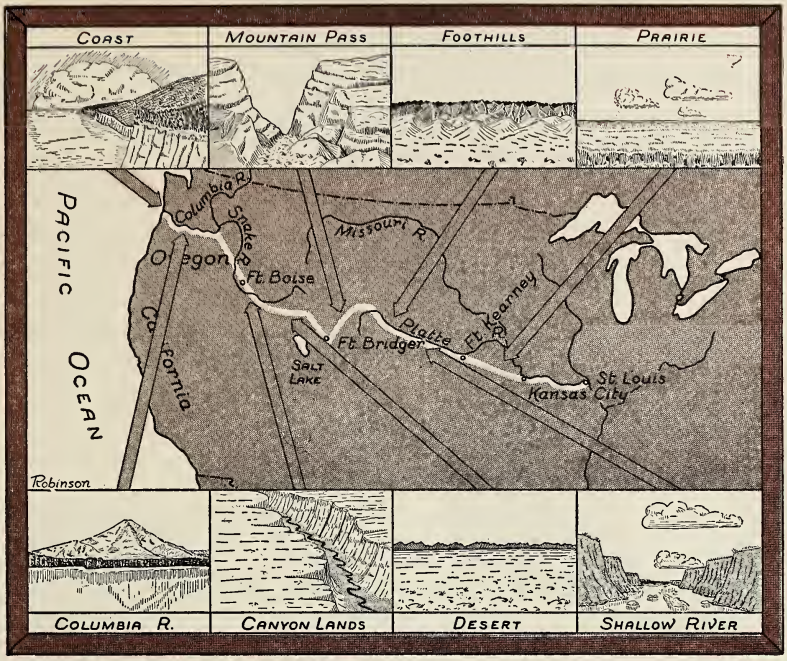
The traders' routes went around deserts unless the way was too long. When a desert had to be crossed, the route led from one well to another, because both men and animals had to have water. Trade routes avoided swamps and thick forests. Routes could not always follow a straight line from town to town, for there might be swamps or thick woods to go around or detours to places

Men who are making roads try to avoid swamps like the one you see in this picture. Such swamps are so hard to cross that most roads are run around them. They are a barrier or obstacle to roads.

where streams could be easily crossed. But the routes usually followed the quickest, easiest way, the way that took the least time and meant the least work.

A good way to learn about these trade routes is to study one of them carefully. Many of the things you learn about this route will be true of all routes. A good route to study is the famous Oregon Trail. Perhaps you have read about it already, for it was the route used by thousands of American pioneers, settlers, and traders.

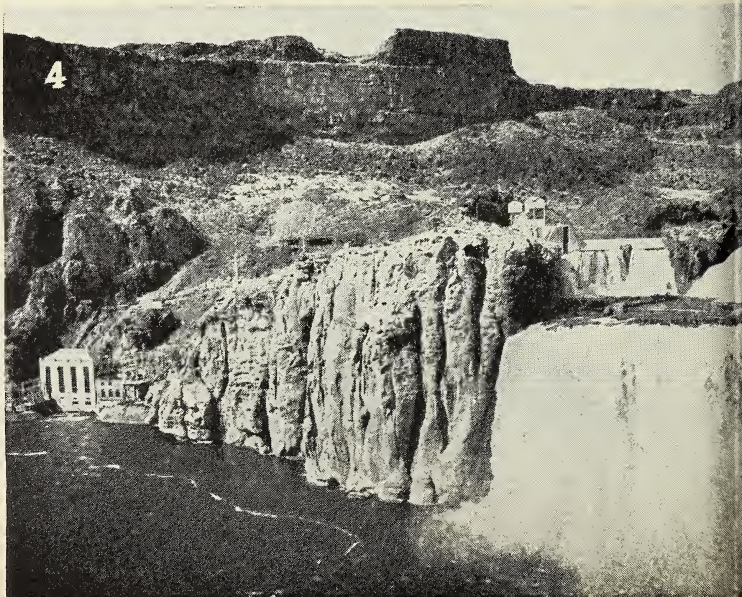
The Oregon Trail is only one of many trails that you could study. Perhaps a famous trail or settler's route crossed your state. If so, probably your teacher can obtain information about it from the state his-



The white line on this map shows the old Oregon Trail which settlers followed from the Mississippi River to the northwestern part of the United States. Above and below the map are small drawings of different kinds of land over which the Trail passed. On pages 276 and 277 you will find some photographs of land along the Trail.

torical society. You can read stories about children who moved with their families from one part of the country to another. Some of the stories have been written about real people, others have been made up. When you read them, you will see how important the trails and the traders' routes were to the settlers. You will also see that the kind of land where the people settled was very important to them. When you look at the pictures on pages 276 and 277, try to imagine living in each different place you see. What would your house be made of? What would you burn for fuel? What kind of animals would you keep?

The pictures on these two pages were taken along the Oregon Trail. Picture 1 shows a line of covered wagons that were used in making a moving picture called "The Oregon Trail." It shows dry land dotted with sage brush. The other pictures show corn and wheat fields, cattle and sheep country, forests and rivers and mountains.



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7

Make your own map of the Oregon Trail. On it mark the places where these pictures might have been taken. Discuss the reasons in class.

Many roads follow winding river valleys. There are good reasons for this. You can have an interesting discussion of these reasons.

Trade Routes Are Shorter Now

Our modern trade routes do not have to follow the old highways. Railways had to have different routes than those used by animals. The railways could not go up and down hills as the animals did. They did not have to run close to drinking water and could be built across deserts and over marshy places.

When the automobile was invented, men needed still a different kind of road. They needed roads that were wider and straighter, with fewer curves. With modern machinery we can have such modern roads. We can cut down hills and tunnel through mountains. We can fill in low places and build bridges. Routes can be made shorter and faster in many ways.

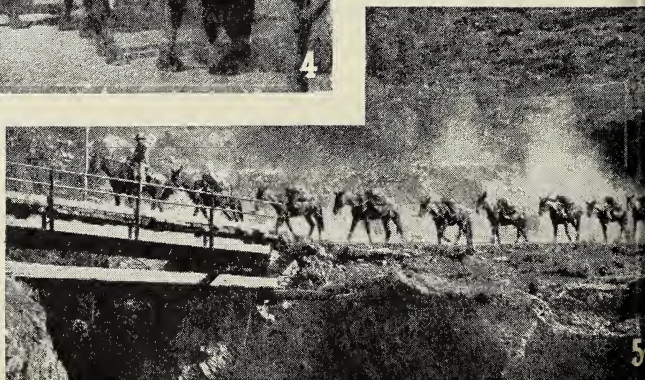
Europe, Asia, and the other continents also have barriers and obstacles to trade and trade routes. Those you see on this page are not very different from those shown on pages 269 to 274.

Picture 1 shows Arab traders stopping at a desert well for water. Picture 2 shows a pass in the Alps.

Picture 3 shows a river valley in France. Picture 4 was taken in a jungle in southwestern Asia.

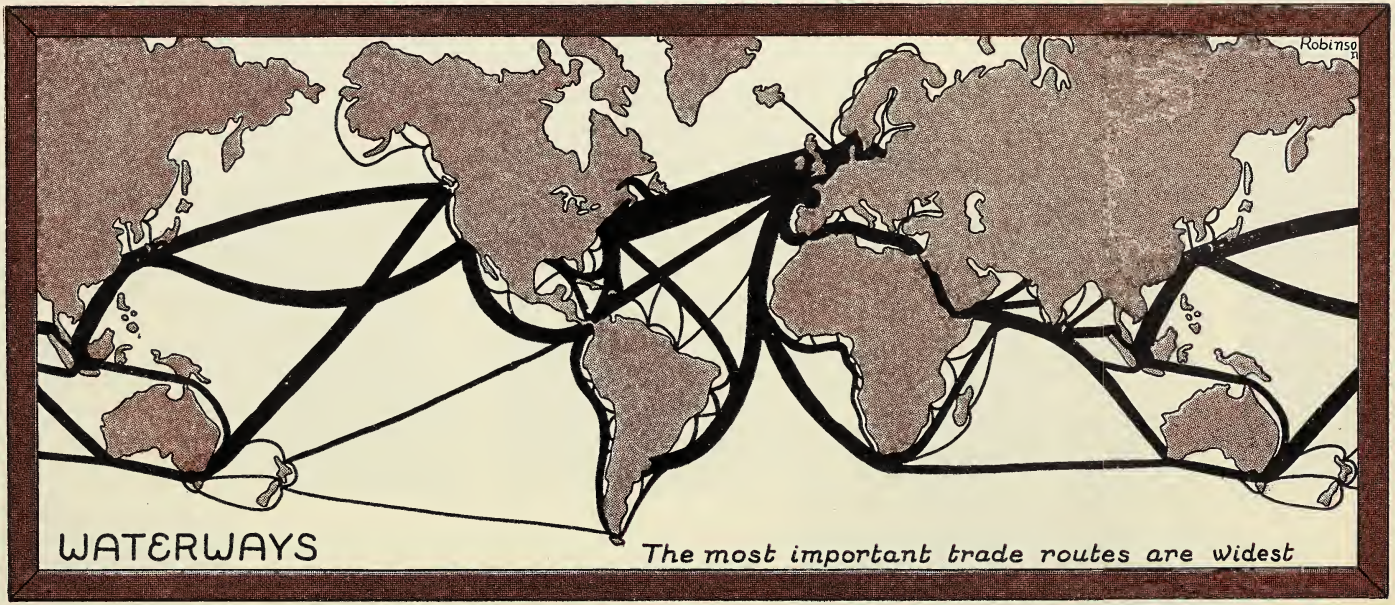
The pictures on this page show freight being carried by men or by beasts of burden. Picture 1 was taken in Africa, and Picture 2 in China. Picture 3 was taken in South America, and Picture 4 was taken in Central Asia. Picture 5 was taken in the United States.

The ways shown on this page were once the only ways of carrying goods from place to place. And even today these ways are still used.



The pictures on this page show freight and goods being hauled in different ways. In every picture you see how men have made use of the invention of wheels.

Picture 6 was taken in China, Picture 7 in Central America. Picture 8 was taken in the western part of the United States many years ago. Picture 9 was taken in a crowded city market in the days before automobiles came into use. Picture 10 might have been taken on almost any highway today.



Ships do not travel just anywhere in the ocean. They usually follow regular routes such as those you see on this map.

There Are Highways on Water, Too

From early days streams have been used as highways for trade and travel. The great rivers of Europe—the Rhine, the Rhone, the Danube, the Volga, as well as many smaller streams—have borne the boats of traders for thousands of years. For example, before Rome was built, the Greeks were trading up the Rhone, and the Phoenicians were there before the Greeks.

To help transportation by water, many canals have been built in Europe, especially in the western part. These canals connect with each other and with the streams, and the traffic carried over this network of waterways has been very heavy.

In our country the Mississippi River and the streams that run into it offer many thousands of miles of easily traveled waterways. Without these streams the country beyond the Appalachians would not have been so quickly settled. Between 1790 and 1820 more than a million people seeking new homes floated down the Ohio River alone.

Before the coming of the railroad, the Mississippi and other streams provided the easiest routes for the settlers to get their bulky products to market, for it was too expensive to carry or cart them over the mountains. Perhaps you have read how Abraham Lincoln

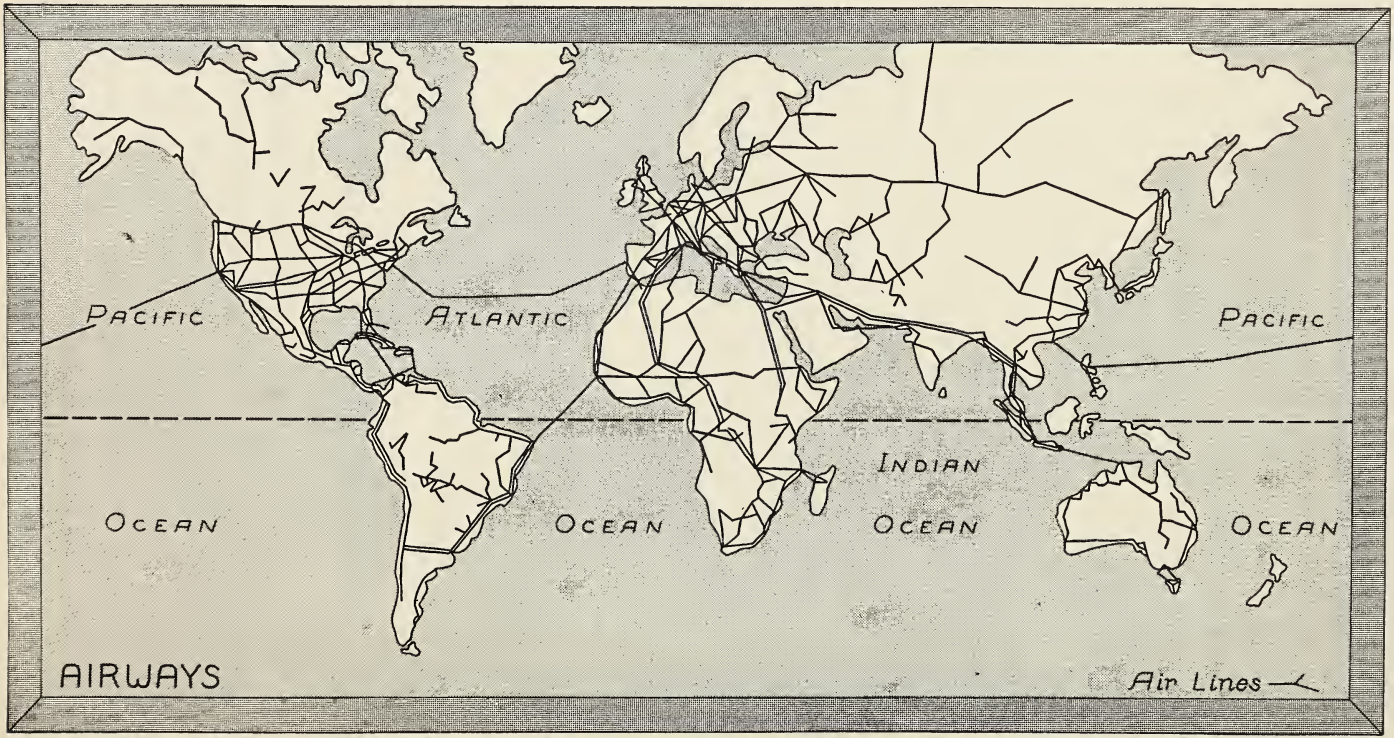
once helped take a flatboat loaded with grain, pork, and live hogs down the Sangamon River to the Illinois River, down the Illinois to the Mississippi, and down the Mississippi to New Orleans.

As the United States grew and more and more settlers began sending their produce to markets, more transportation was needed. Canals were dug and some of them became important waterways. You may have read about the Erie Canal, which was one of the most important. Barges on these canals carried the farmers' grain and vegetables to the cities and carried merchandise of all kinds between cities and towns. In some states, too many canals were dug, or else canals were dug where there were not enough customers, and the bargemen could not make a living.

When the railroads began to carry freight, less and less traffic went by water. Today, however, more and more goods are being shipped by waterways. Great effort is made to keep the channels clear and deep. To keep mud and sand from choking up the mouth of the Mississippi, the channel has been narrowed. This makes the river flow more swiftly and carry the mud out to sea. On the ocean the modern freighters and liners can take the shortest way between ports. That was something the sailing ship could not always do.

And Highways in the Air

Of course, the shortest, fastest ways are the airways. Airplanes need no roads, bridges, tunnels, or embankments. They do not have to fly around mountains or deserts; they fly straight over them. Of course, they do have to fly around or over bad storms. But we can truthfully say that the airway is the shortest way between two places.



The airlines publish maps that show the very latest airways. Each year some new airways are added to the map.

The airways are used by airlines, and most of the business is carrying passengers and mail. Air express is a fast way to send packages, but it is an expensive way. Perhaps you can discover the kinds of articles most likely to be sent by air express. You might ask at the local express office, or you might find the information in a magazine article about the airlines.

Modern Communication

Just as we have transportation on land, on water, and in the air, we also have communication by land, water, and air. Telephone and telegraph lines usually follow highways and railroads from city to city and town to town. The mails are carried on ships, highways, railways, and airways. Cables are laid in the oceans from one continent to another. And through the air the wireless, or radio, sends messages.

On pages 288 and 289 are pictures showing some of the many different kinds of communication. When you look at them, you will see that this word, communication, means a great deal more than the writing of a letter, telephoning, or telegraphing. The authors of this book are communicating with the readers; they are passing their ideas on to other people. Books, newspapers, and magazines are ways that people use to communicate ideas to one another.

All the tools and machinery used for writing, printing, mailing, telephoning, and so on, are an important part of our communication system. The man who sets type in a printing shop, the postman who brings the mail, the electrician who keeps the radio working—all these men are a part of the system also. If you should study just one kind of communication, for example, the mail, or the radio, you would soon see how compli-

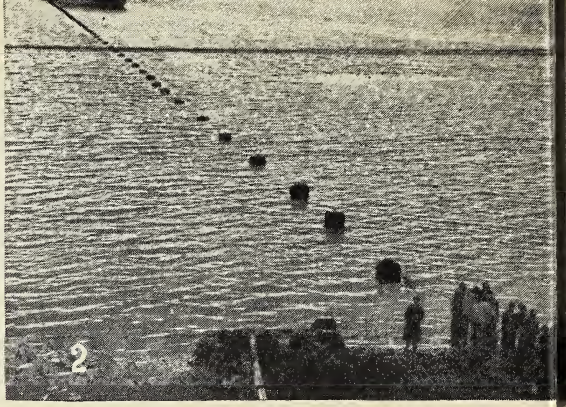
cated it is and realize how many people are needed.

The jobs, the tools, the machinery—everything connected with communication—are necessary because we have come to rely so much on communication. Long ago, when most people in Europe lived on medieval manors, like those you read about in Chapter Four of this book, swift communication wasn't particularly needed. If a visitor came, he told the news he had heard and then went on his way. Not many letters were written because only a few people knew how to read and write. For the same reason, most business was done by people who met and talked things over.

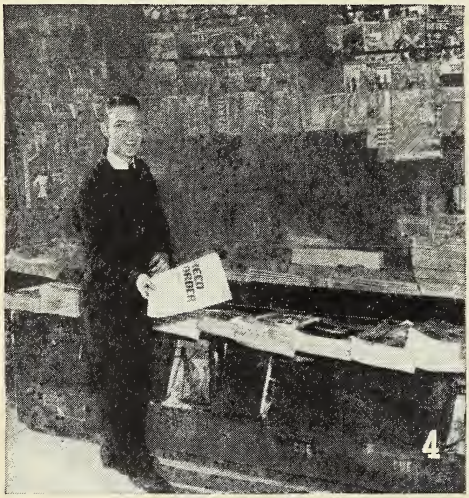
Today we do things in a very different way. People read the news in newspapers and hear it over the radio. They read magazines and books, and they write letters. Business men write and telegraph and telephone about their business. Almost every family has some need, every day, that cannot be satisfied without making use of at least one of the different kinds of communication. If you will write down the things your family did yesterday, you will see that this is true. Did someone in the family order anything at a store? Did anyone read a newspaper or a book? Did anyone write a letter? Perhaps you can describe the kinds of communication your family made use of, and perhaps even tell something about the people who helped and the work they did to make the communication possible.

Exchanging the World's Materials

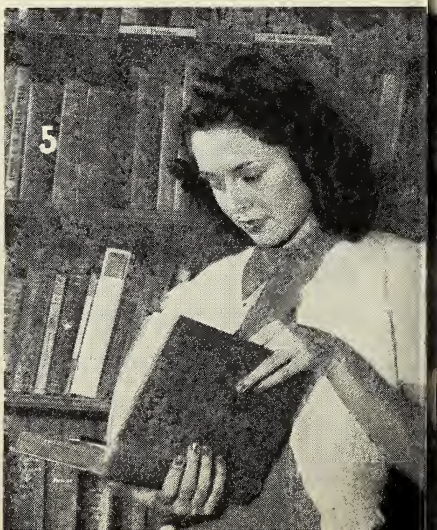
ALL THESE ways of communicating and of sending materials and merchandise from one place to another help carry on the world's business. Each car on every railroad, every automobile and truck, every street and road, each telephone, each radio—all these help us

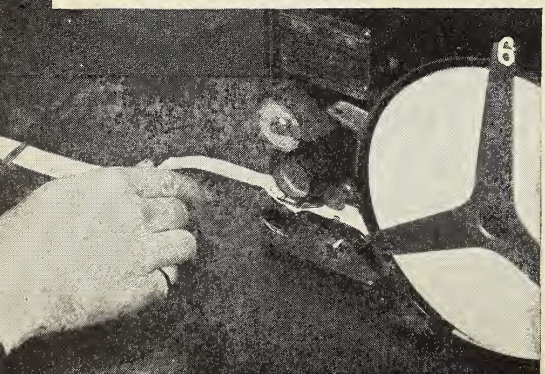


Picture 1: Country mail carrier. Picture 2: Laying an ocean cable. Picture 3: A telegraph messenger. Picture 4: A newspaper and magazine stand. Picture 5: Books in a library. Picture 6: A teletype machine that prints letters by telegraph. Picture 7: A telephone exchange. Picture 8: Postal workers sorting mail.

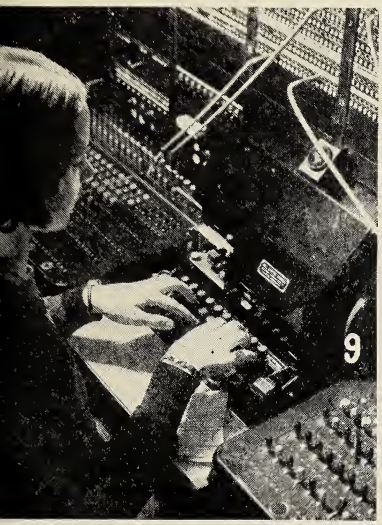


All the pictures show different kinds of communication.

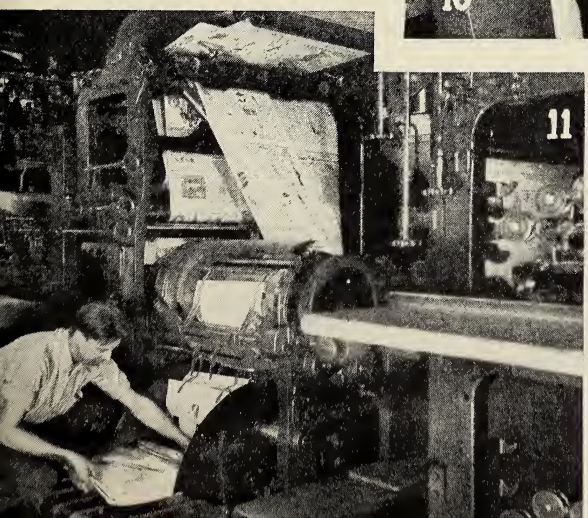




The girl in Picture 9 is typing a message that will go by wire. At the other end of the wire, perhaps in another city, it will be printed by the machine in Picture 6. The man in Picture 10 is making a phonograph record. The machine in Picture 11 prints newspapers. The one in Picture 12 is used to send pictures by wire.



Make a list as long as you can of different kinds of communication. Discuss the different kinds in class.



to exchange the resources of one part of the world for the resources of another part. And every store, every office, every warehouse is also a part of the world's business, too. Without them it could not be carried on.

You probably know that we need help from other people to meet most of our needs. Did you make a list of your own needs after reading Chapter One? If you did, perhaps you underlined the needs that you or some member of your family could supply without help from other people. Probably there were not many of these needs underlined. In much the same way, you learned as you studied the resources of your region, that many of your needs are supplied by resources from other regions.

Suppose the people in your region decided that they would not trade with the outside world at all! Then you could use only the things which could be grown or produced in the region where you live. You would have to get along without many things on your list. Suppose you make a list of your needs, or take one of the lists you have already made, and divide it into two lists. At the top of one write "Needs Which Can Be Satisfied by Resources Within the Region." At the top of the other write: "Needs Which Can Be Satisfied Only by Trading Outside the Region."

If the entire class makes this list, you could have a good discussion about the changes that would come in your life if trade with the world outside your region stopped. You might even have a debate. One side could argue that we should not trade with other regions. The other side might argue that we should trade with all regions. Or perhaps the first side would rather argue that we should trade only with regions in the United States, or in North America.

While you are having your discussion about trade, you will need a map that shows where different materials come from. There are several ways you could show where materials are produced:

1. You can use small outline maps of the world and mark on them the regions that supply the materials. Use one map for one or two materials only, so that the map is not crowded too much.

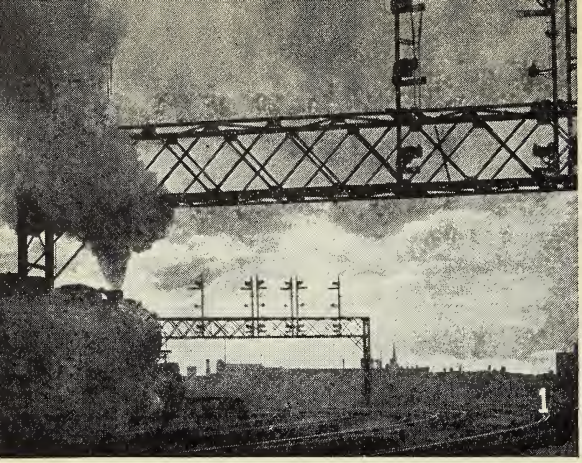
2. Another way would be to make a large blackboard map on which several pupils could work.

3. You might draw symbols to stand for the different materials. Cut them out and tie strings to them. Pin them up beside a large map and run the strings to the places on the map that supply the materials.

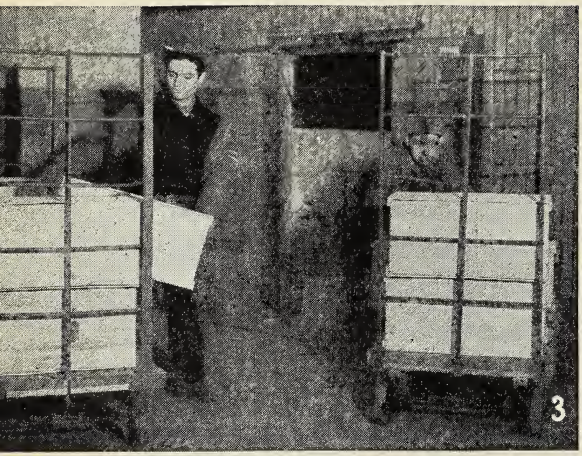
4. A more interesting way, but one that means more work, would be to make a display or exhibit of samples of different materials, with a large wall map for a background. Strings or ribbons of different colors could lead from the sample to the place on the map that produced it. For example, a string from a piece of chocolate to the country of Bolivia in South America, and strings from a piece of rubber to the Malay Peninsula and to Brazil.

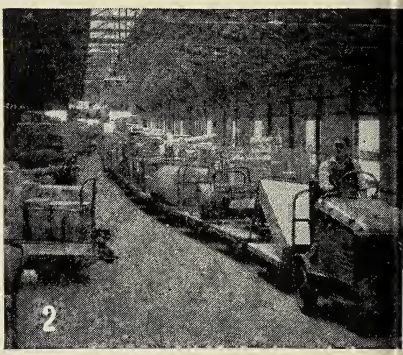
If the people in your region bought all the things they needed and never sold anything, they would soon be out of money. Then they would not be able to buy anything. In order to buy from the outside world people in your region have to sell something to the people in other regions of the United States and the world.

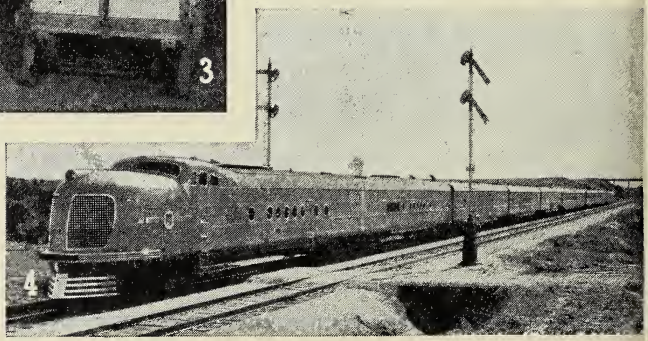
You have made several maps and lists of resources that are produced in your region. Now make a list of things which people of your region have to sell. This won't be a list of the things you find for sale in the stores, but a list of materials and products that are grown or raised or mined or made in your region. When you have the list

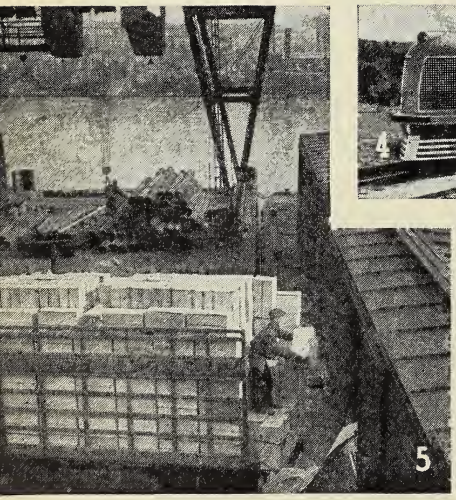


These pictures are to give you some idea of another kind of resource—a kind that has been made by men. The things you see in these pictures are needed in the work of transportation. On the opposite page is a list of things found in these pictures. Make another list of more things used in transportation.



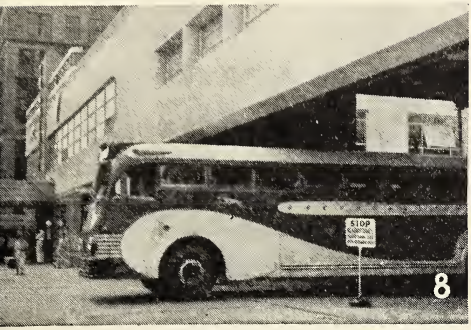




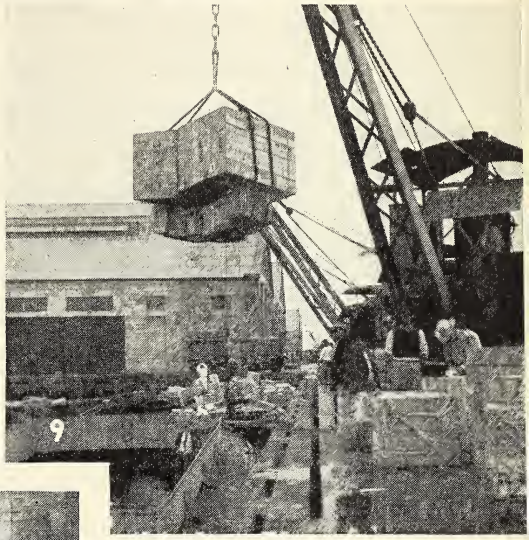


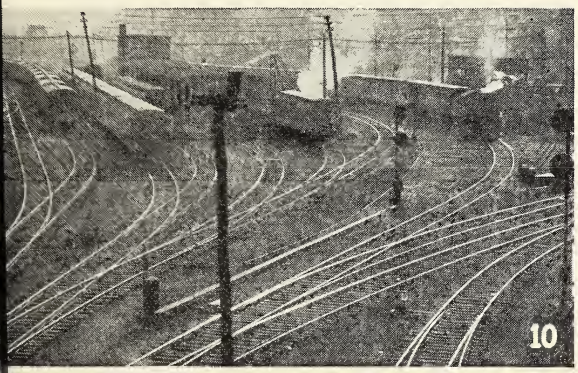
Make sure that your list contains the things you see in the pictures on these pages.

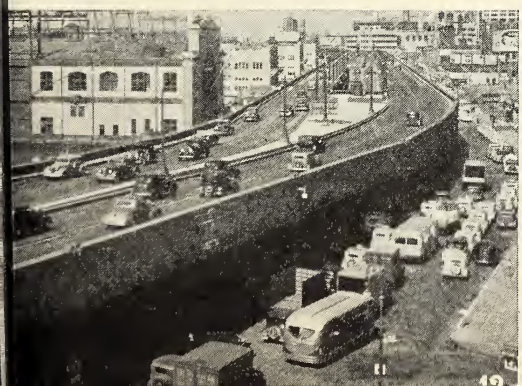
In the pictures on these two pages you will find: stations, freight houses, warehouses, viaducts, bridges, loading machinery, tracks, freight cars, passenger cars, motor trucks, trailers, hand trucks, busses, loading platforms, freight steamers, and other resources.



Most of the pictures on these pages are of railroad transportation. You might collect pictures of other kinds.







One important kind of transportation is not shown here. It is used mostly for passengers and mail. What is it?

done, compare it with the list of things the people in your region must buy from the other parts of the world.

You read in this chapter that it is often difficult for a man to make a trade with another man. Look again at the pictures on page 242. Money came into use to make trading easier. People take it in exchange for what they sell. And they can exchange this money for things they want. Sometimes people forget that money isn't any good unless they can exchange it for things they want. There are stories about people who forgot that. Perhaps you can find and read the legend about King Midas.

The pictures on page 261 show some of the reasons why trade was not very good during the Middle Ages. Perhaps two or three pupils in the class can get together and write a short play about a merchant that will illustrate these reasons for poor business. Then the class can talk about what our government does to help business. Members of the class should be ready to answer questions about what our government does about robbers, about poor roads, about coins and money, and about weights and measures.

Trade depends upon swift and safe transportation, as well as on other things. An interesting thing to do would be to find out how important transportation is to some of the stores in your community. You might appoint a committee of four or five and have them investigate this and make a report to the class. Each member of the committee could call on one business man in the community. If one of the committee decided to call on the man who runs the shoe store, for example, he could ask the storekeeper such questions as:

How does the storekeeper order his goods? By telephone, by telegraph, or by mail? Or does he wait and give the order to a salesman who calls on him?

Where do the shoes and other things he sells come

from? How far away are the places? Do the shoes come by mail, by express, by railroad freight, or by motor truck? How long does it take to get them?

When the committee members report to the class they can show on maps the routes that the orders and goods must take. The class can talk about the time required to get goods from trade centers in your region and in other regions. The pupils can look at railroad maps, airline maps, and road maps and try to discover if goods came the shortest way, the quickest way, or the cheapest way.

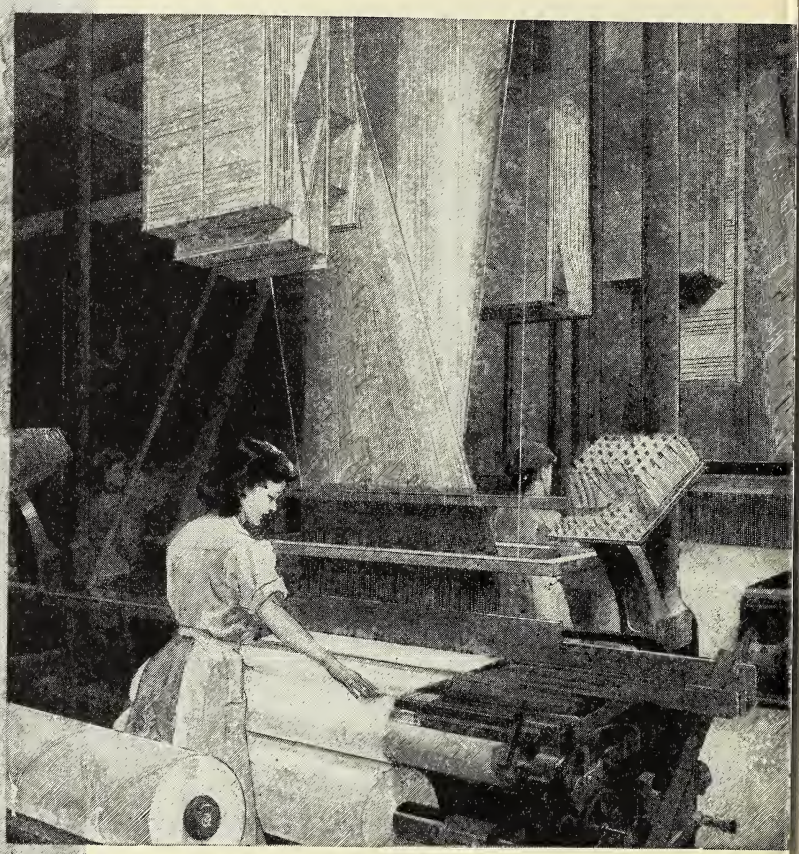
Here are some words to add to your glossary. But first you should look them up in the dictionary.

communication
money
borough
toll
caravan
radio

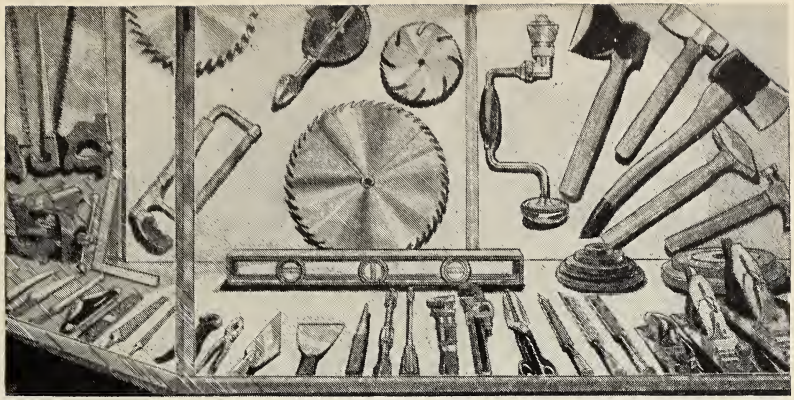
transportation
trade
burgher
commerce
cable

guild
exchange
ferry
curfew
telegraph

CHAPTER SEVEN



THE MAKER



A hardware store is a good place to see products of manufacturing.

Manufacturing in Early Days

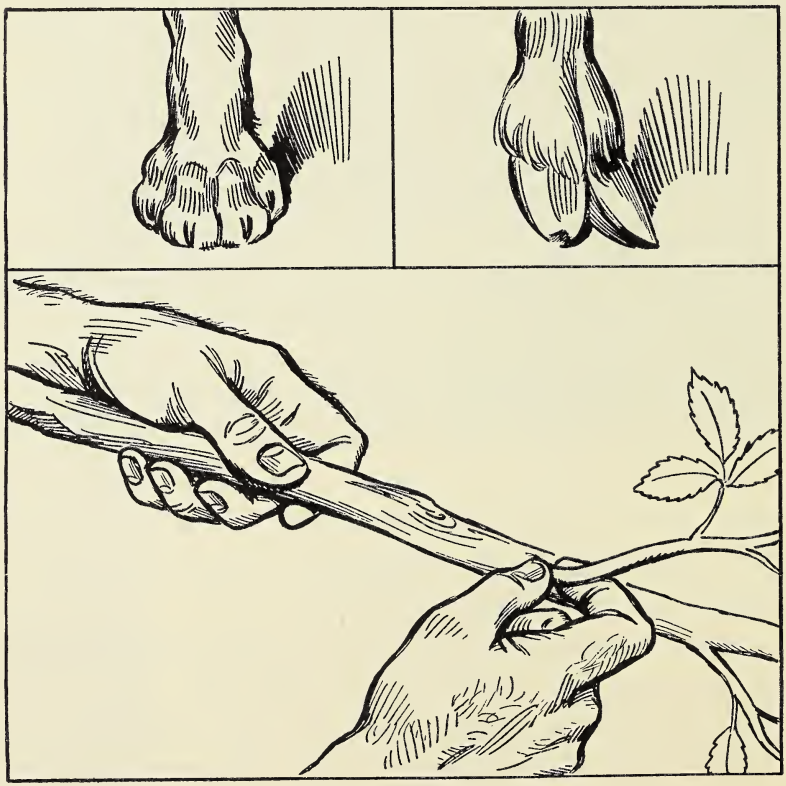
MEN ARE not the only creatures that can make things and make them skilfully. The hornet builds a nest of paper. It makes the paper by chewing up bits of weather-worn wood and plant fibers into a paste which dries as it is spread out. The nests of many birds also show skilled workmanship. The robin, for instance, is a mason, lining its nest of twigs with mud, which is carefully plastered down and smoothed almost as if a trowel were used. The Baltimore oriole is a beautiful weaver, making a long bag-like nest, which it firmly hangs to a branch. The beaver is both carpenter and mason. With his sharp teeth he gnaws down trees and cuts them up into logs with which to build his dams. He also builds large houses of branches, which he plasters on the outside with mud.

These animals, however, always make the same things in the same way with the same materials. The hornet will not make a nest of leaves, nor will the beaver ever build a dam without using wood. But men have been

able to think of new things to make and new ways in which to make them, because a man has a brain far better than that of any of these animals. Men have also found new kinds of materials. And because men have hands, with fingers and thumbs to grasp things, they have been able to make and use tools that help with their work. That is something none of these animals can do.

For many thousands of years, while early men were hunters or learning to make a living by herding or farming, they made things just for themselves. If a man wanted something made, he had to make it himself or

These three pictures show how our hands, with their fingers, are so very much more useful than animals' paws and hoofs.



When beavers make a dam, they always make it the same way, out of sticks of wood, as the dam in this picture is made. They make their dams the same way that beavers have made dams for thousands of years. Men, however, have improved their ways of making dams, as you can see by looking at the pictures on page 322.

do without it. But later on, as you have read, people who lived near certain kinds of raw materials began to make articles for trade. For instance, those who lived where there was plenty of flint made tools and weapons for trade. People discovered that they could earn a living just by making things for others.

Of course we shall never know how or where people first tried this new way of making a living. We can, however, imagine a number of ways in which it might have happened. Perhaps one of the boys in a farmer's family liked to play in the mud. When he grew up, he did not like farming, but he could make better bowls and jars of clay than any person for miles around. The neighbors liked his pottery better than what they made for themselves. Some liked it so much that they

were willing to trade grain or vegetables or whatever they had for his fine pottery. By and by the young man discovered that he would not need to farm for a living if he could only trade enough bowls and jars for food and clothes.

Perhaps a herdsman fell sick one spring and was left behind when his tribe moved on with the animals. Perhaps he was left in a village of farming people. Because he was used to working with hides, he could make sandals and saddles and harness and other things of leather. So he made leather things for the people who gave him food. Since the farmers were not skilful at working with leather, they were glad to have this man do that kind of work for them. When the man got well and began to think about leaving, perhaps the farmers persuaded him to stay on in their village and then paid him in food for making their leather goods. Or perhaps money was used in paying.

Perhaps a whole village of people became expert at making baskets, because the necessary grasses were very plentiful nearby. Then men and women for many miles around would go to that village when they wanted baskets and would bring along food and other things to pay for them. Sooner or later, someone in that village would decide to make baskets all the time for a living instead of farming most of the time and making baskets in his spare time.

Craftsmen and Their Crafts

This early kind of manufacture was carried on in people's homes. Workmen became expert because they spent most of their time doing one kind of work. They learned to do their particular kind of work well and rapidly whether it was leatherwork, basket-making,

The girl who drew this cartoon thought that the injured shepherd might have started in business this way. Perhaps you have a different idea and can draw pictures to show it.

or any other kind. They became skilful, and as time went on they slowly learned new and better ways of working.

These workers, with both skill and special knowledge, were called craftsmen. They could do far better work than men who had not carefully learned their craft. Today we still call a worker with special skill and knowledge a craftsman, even if his work is different from that of the earlier craftsmen.

The craftsmen who worked with wood were carpenters and joiners; those who worked with metal were smiths. Tanners, weavers, dyers, tailors, masons—each craft had its name. Many people today are named for the craft followed long ago by an ancestor of theirs. You probably know some one named Smith, or Carpenter, or Miller, or Potter, or Mason. And a few names are all that are left to remind us of some of the crafts of long ago. For instance, everyone knows what a smith or a weaver is, but how many people know that a lorimer was a maker of bits, spurs, and metal mountings for bridles and saddles? Not many know that a fletcher made arrows.

It is not surprising that men became known by the name of their craft. Usually a son was taught his father's work, and so knowledge and skills in some special handicraft became a family affair. The craft was passed on from generation to generation. This custom was so strong in many countries that it was not always easy for a son to leave the craft his father practiced, even if he wanted to. In fact, in some places the custom has been continued even up to the present time. For example, in certain regions in Germany, the craft of toy-making has been handed down in the same families for many generations.

This Chinese workman is a potter, making vases, cups, and bowls on a potter's wheel. Probably he belongs to a Chinese potters' guild and follows the rules of the guild in his daily work.

Becoming a Craftsman

In the Middle Ages, as the farm villages grew into towns, and a few towns into cities, people began to want more and more things. More and more craftsmen were needed. Many craftsmen did not have enough sons to help make the things people wished to buy from them. And so an expert craftsman would take into his house several young lads whose parents wanted them to learn a craft. They would work for him for a certain number of years—sometimes as much as seven. The expert fed, clothed, and lodged them, but they received no wages. Such a young helper was called an apprentice, and the expert was called a master craftsman.

An apprentice would begin by doing only simple odd jobs until he learned to do more difficult things. He would run errands, take care of the tools and sharpen them, pump bellows, mix paints, tie knots, keep the workshop clean, and do other things that young boys could do. Gradually he would learn to do more and more of the real work of the craft.

After the apprentices had served their time and had learned their craft thoroughly, they were allowed to work for pay by the day. Then they were called journeymen, not because they traveled—although they often did—but because *journée* is an old French word for a day's work. These journeymen might go on working for their master or else they might go around working for other masters of the same craft, learning new ways of work. A journeyman who was very clever and who had saved enough money to set himself up in business might in time become a master himself with his own shop and apprentices. But before he could set himself up as a master craftsman, he had to submit some fine pieces of work to experts in his craft to prove that he was a skilled workman. A goldsmith, for instance, might make a fine necklace or ring.

Craftsmen Got Together in Guilds

In the larger towns and cities there might be many masters of the same craft. Sometimes they might all be settled in the same street, which was often named for them as, for instance, the Street of the Armorers. All these workers had to have the same kind of raw materials and often sent their products to the same markets. They could not carry on business unless plenty of raw material was always on hand and the finished goods could be taken to market.

Craftsmen learned their work after years of experience in shops. The shop in this picture is a goldsmith's shop.

Some guilds became wealthy enough to build fine halls where the members met and transacted business. The guilds became wealthy by collecting dues from the workmen or merchants who were members. The buildings in this picture are guild halls in Ghent, Belgium.

These things could be managed best when the craftsmen got together, just as the merchants got together in merchant guilds. And so the craftsmen of the Middle Ages also had their guilds. These guilds became very numerous—there were fifty guilds in the small English town of York.

It was also the business of the guilds to see that the goods made and sold in their city were of good quality, so that customers could depend on them and would want to get them. It was also the business of the guilds to see that no more goods were made than people wanted. They made rules about the number of hours apprentices and journeymen might work as well as the number of helpers a craftsman might use. The guilds

were powerful enough to prevent men from working at a craft unless they belonged to a guild. Of course, there were some workmen who did not belong to guilds. But they generally lived just outside the city walls or else in small towns and villages where there were no guilds.

And so it happened that the apprentice boy who was learning a trade or craft was also preparing to be a member of the guild of the weavers, or joiners, or whatever craft he was learning. He knew that the guild would decide what wages he should receive, would pay him something if he were ill or crippled, and would even take care of his funeral expenses when he died. If he were a country boy, the son of some serf who worked on a big estate, he knew that the guild would protect him. And many young, ambitious serfs fled from the hard life of poverty and heartbreaking labor to become apprentices in the towns. For such boys the only hope was to get to a town, learn a trade, and become a member of a guild of craftsmen.

How Life in the Country Changed

As the years passed, more and more people moved from farms to the towns, some of which grew into cities. Of course there were many reasons why people moved away from the farms, but some of the reasons are especially important.

As you have read, most farmers spent a part of their time making things in their homes. Some made cheese, brewed beer, worked leather into harness, wove cloth, made baskets or pottery, or did woodwork. But when men in the towns and cities began doing that kind of work, these workmen became more expert than the farm workers. Because they worked at their jobs all

day, they could make things better and make them cheaper than the farm worker who worked only part of the time. And so fewer and fewer things were made on the farms. That meant idle farm workers. Of course, there were things that farmers kept on making, as, for instance, beer and cheese. And on many farms the weavers were still kept busy.

Many farm workers became idle because landowners, especially in England, began turning their fields into pasture and raising sheep. They did this because the cloth weavers in the towns were beginning to sell lots of cloth and needed more wool than ever before. The large landowner saw that he would make more money keeping sheep and selling the wool to weavers than he could by raising crops. But only a few men are needed to take care of many hundreds of sheep. And so, when landowners turned to raising sheep, there were many idle farm workers.

There was another reason why people left the country and went to the cities. In the latter part of the fourteenth century a great plague swept over Europe and many persons died. Landowners were left without enough serfs to work their farms. These landowners were glad to rent their lands to tenants who paid rent in money. The serfs on the rented farms were forced to leave because the new tenants intended to do all the farm work themselves.

Landowners were discovering that free men did better work and more of it than serfs. You can see why that was so. For one thing free men could profit from their labors and improve their condition. But no matter how hard a serf worked, he could have no hope of any change for the better. Now a man who works without hope or ambition is seldom a good worker. It was really

Thousands of acres of English land, like the land in this picture, were too hilly to farm, but were good grazing land for sheep.

cheaper in the long run for a landowner to hire good workers than to have the work done by careless serfs. But this meant that many serfs became idle.

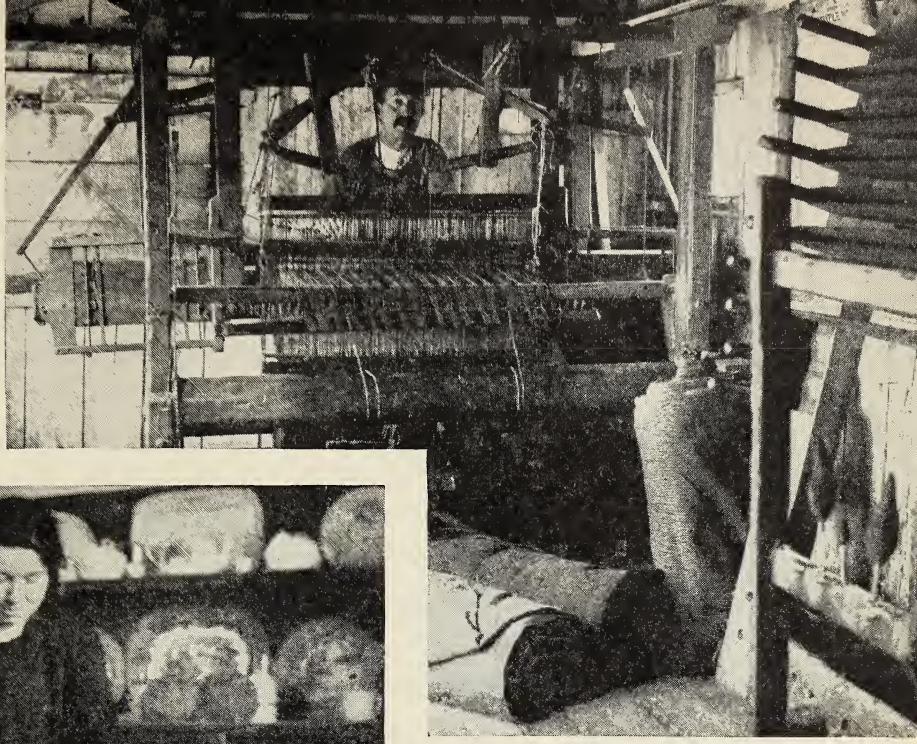
As the cities grew, more and more food was needed for them. Farmers could get good prices for the food they raised, and so they tried to find ways to produce more. One of the things they learned was to plant root crops, such as turnips, in fields that were lying idle. This helped the soil. It also provided more feed for cattle so that farmers could keep larger herds. But in some of the new ways of farming, fewer workers were needed. That meant more idle men!

Some of the men who came flocking into the towns and cities had a chance to earn their living in the crafts. They were the ones who had some special skill. Others found odd jobs, such as serving as porters, while others found no jobs at all. Most of these men had come to the towns because life in the country was changing. But there was a great change coming—a change which would give men outside of guilds greater chances to get work. In fact, this change was to mean that the craft guilds would disappear.

Making Things by Hand

In the time of the craft guilds the work of making an article was done in the home of the master craftsman. He bought the raw material, did part of the labor on the article, and sold it, often over his own counter. He was an expert buyer, a skilled workman, and a salesman all in one. Just as the lord of the manor was the proprietor (owner) of his lands, so was the master craftsman the proprietor of his shop. And just as the lord controlled the lives of his serfs, so did the master craftsman control the lives of his workers. Of course, the workers were not entirely under the control of their masters, since the guilds made rules which helped and protected them.

This way of making and selling goods was carried on for several hundred years. There were no factories at all like the factories of today. Even in the big workshop of an important master craftsman, the number of workmen and apprentices was small. The things turned out in the workshop of the old-time craftsmen were of high quality and beautiful workmanship. But they were not turned out in great quantities, nor were they turned out quickly. You can surely see why that would be so.



Even today many things are manufactured in peoples' homes. The picture at the top of the page shows the home of a French weaver. His loom is in one room of the house. The picture at the side of the page is of an Irish worker. She is carding wool that will be made into yarn.

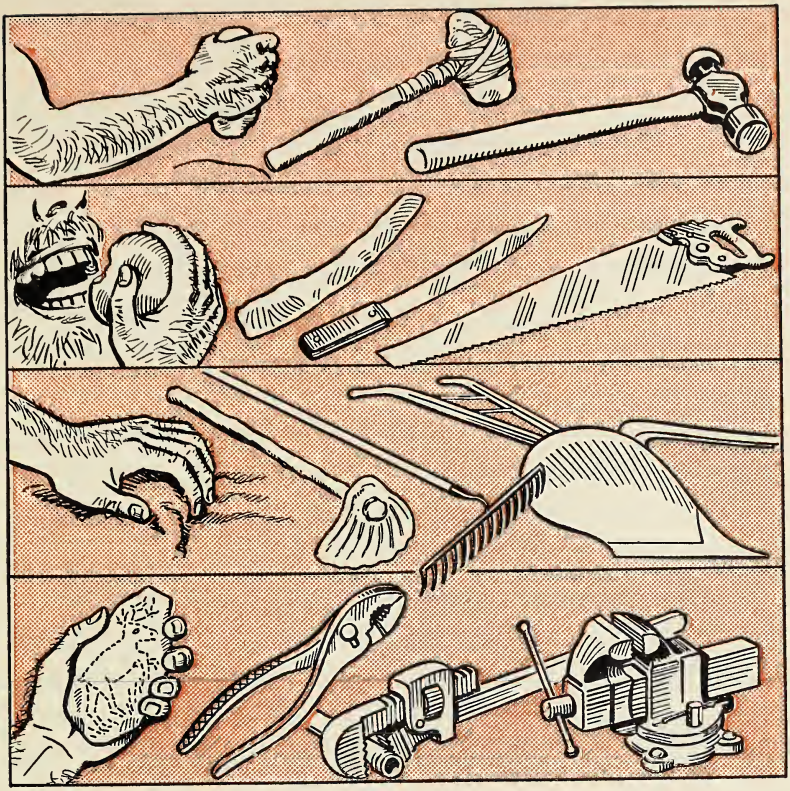
The last picture shows a Scottish spinner working at the door of her cottage. All three workers on this page earn a living partly by selling what they make and partly by working on the farms where they live. Perhaps members of your class know people who work at home making things to sell.

But there was great need for cheap goods made in quantities, and gradually a way to get them was worked out.

The Beginning of a New Way

Cloth merchants were among the first to get goods made more cheaply. Merchants who had money enough to buy a supply of yarn went around looking for idle weavers. And they were easy to find, for there were many men skilled in weaving who were out of work, without money enough to buy yarn for themselves. Some of them were journeymen who had failed to become masters, perhaps because there were already too many weavers in their guild. Many were men who had been part-time weavers on large estates or had worked for themselves in small towns and villages where there were no guilds. Some perhaps had been sick or had suffered from other misfortunes. At any rate, they were glad to get work even at low pay when a merchant offered to supply yarn and pay them for weaving the woolen cloth. Merchants who sold other kinds of goods did the same thing. They supplied workmen with materials—often with tools—and later came and took the finished goods away to the market.

Because the workman did his work at his own home, this system of working was known as the domestic, or cottage, system. The master craftsman had worked in his own home, too, but he purchased his own raw materials and sold his finished products. Now, instead of being independent and working for himself, the workman was really working for the merchant. The merchant who hired the worker did not need to be skilled in the craft. What he needed more than skill was money to carry on his business.



Tools are useful because they help us to do "hand" jobs in a better way. You can pound with your closed fist, but a stone in the fist would be better. A stone tied to a stick would be even better, but a steel hammer would be better yet. Look at the other pictures and notice the kind of work the tools are used for. Are there other kinds of work for tools besides pounding, biting or tearing, scratching, and holding? Discuss this in class.

The Coming of Machines and Factories

THE OLD slow way of making things by hand had done very well up to the time of your great-great-great-grandfathers. But by then cloth—especially woolen cloth—fine steel tools, clocks, and many other things made in Europe were being sold as fast as they were made. Ways for making things faster and in greater quantities

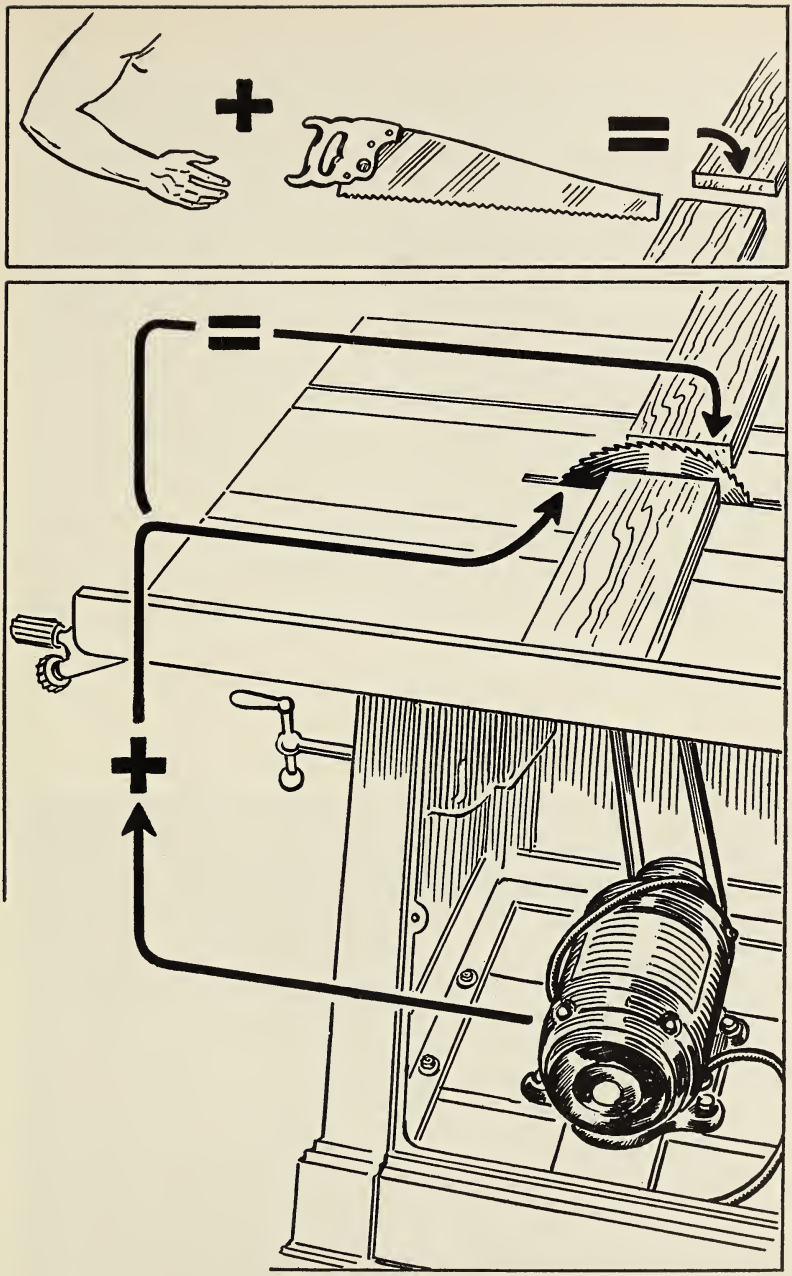
were needed. Machines could do this, and people were beginning to invent them. And to use them!

Now you know that a tool is something that helps a man work. Well, a machine is a tool, too, but it is a complicated one. A hand saw, for instance, is a tool, but the man who is using one must also use the power of his own muscles to work it. A circular saw, however, is a machine, because it is more complicated than a hand saw and because it takes a different kind of power to run it. The circular saw may be run by a water wheel, by a horse, by an electric motor, by a gasoline or a steam engine. Because it is a machine, a man can do much more work with it, and much harder work, than he could with a hand saw.

Because machines need power to run them, the workman in the home could not use them. He did not have a waterfall in his back yard or any kind of engine to use. The weaver or spinner could use the simple looms and spinning wheels all right, because foot power was enough to run them. But the new machines needed more power than a man could supply with his feet or arms.

There was another reason why the ordinary workman could not take advantage of the new machines that helped make goods faster. Machines are costly to make, to buy, and to run, and a poor workman would never have enough money for all this. But there were men who had the money or who could manage to get the capital, as we call money used in carrying on business. These men had machines made, and put them in buildings, and hired workmen to run them. In this way the first factories were started.

You can see that the workman in the factory was really working for another person. He did not work in



An arm for power plus a hand saw equals a board cut in two. You get the same result with an electric motor for power plus a circular saw. Both saws are tools, but the circular saw is also called a machine. You can see that it is more complicated than the other.

his own home where he could put in as little or as much time as he pleased. He worked in another man's building, with another man's raw materials and machines. Besides, he was told when to begin work and when to stop. Because the man who hired the workman was paying for his time, he tried to make certain that his employee was "on the job" all day long.

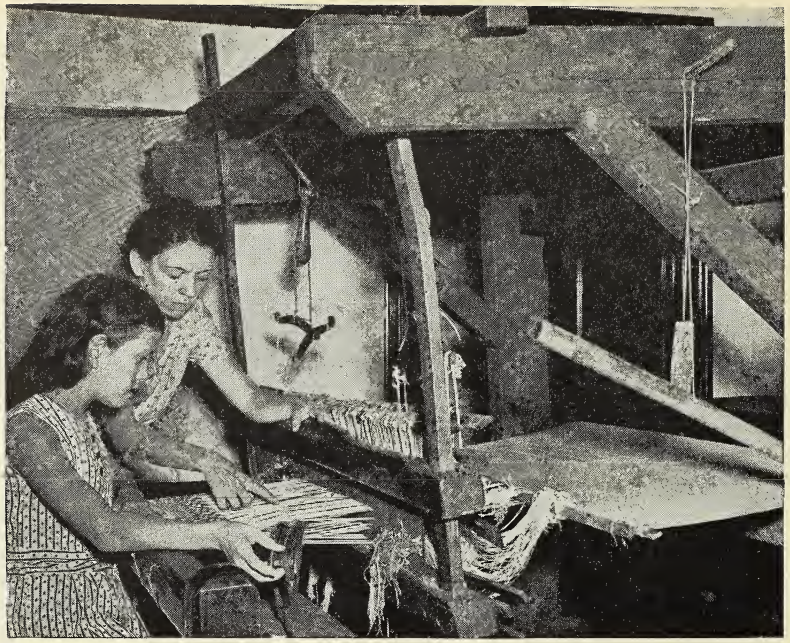
You can see that the factory worker was not an independent worker as the guild craftsman or even the cottage worker had been. Since the factory worker did only part of the work on an article, instead of making it all as the craftsman usually did, he had a different kind of skill. Then, too, he was paid for his time and not for the finished article. The guild craftsman, who made an article from beginning to end, tried to turn out perfect work. The factory worker, who made only one part of an article, could not take the same pride in his work.

Part of a bronze door made by a skilled craftsman.

For many centuries animals have been used to furnish power for running machines like the one in this picture. The little Egyptian boy drives the camel around and around for hours every day. The camel turns a big wooden wheel that dips water from a ditch into a trough. Then it flows between rows of growing vegetables. The camel furnishes much more power than the boy could furnish.

Finding Power to Run Factories

Of course the men who owned the factories had to have power to run their machines. In the early days of factories, however, there were few kinds of power that could be used. Patient horses and mules, walking, walking, walking on treadmills were used to furnish power. The wind also was used to turn windmills. But men also knew how to get power from falling or swiftly-running water by means of water wheels. Because the water wheel was a cheap way to get power to run the machinery, many early factories were located on the banks of streams.

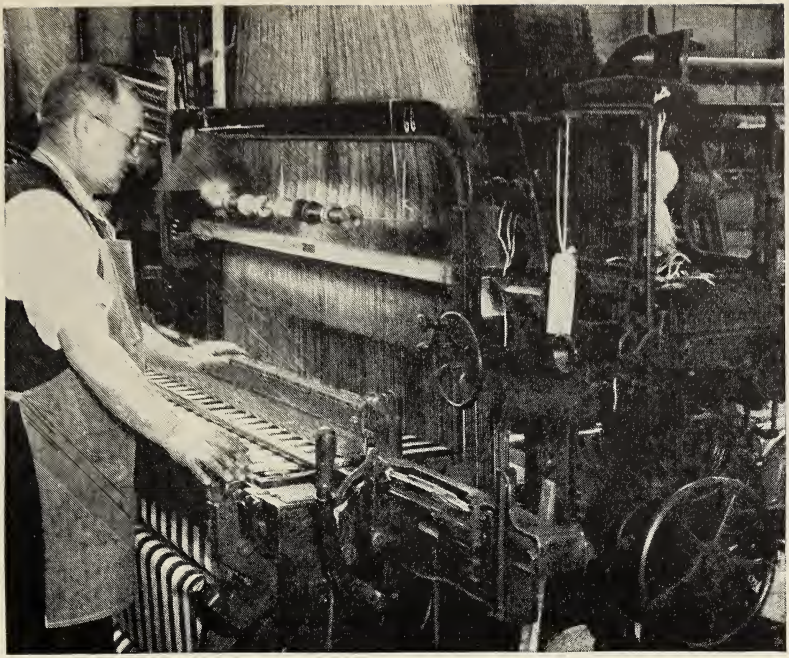


This loom, which the little girl is learning to run, is a good example of wooden machinery. Long ago almost all machinery was made of wood. The machines were simple and not hard to make.

Machines of Metal

Most of the first simple machines were made of wood, for men were used to working with wood and had the tools for doing so. If something happened, say, to a wooden loom, the workman could easily repair it. But when wooden machines were run by water power instead of by foot power, there was a greater strain on them. Some of the wooden parts broke so often that the repairmen finally tried replacing the broken wooden parts with parts made of metal. And so, little by little, men came to make machines of iron, steel, and other metals.

As you have read, metals had not been used a great deal up to this time. Metal is hard to work with, and



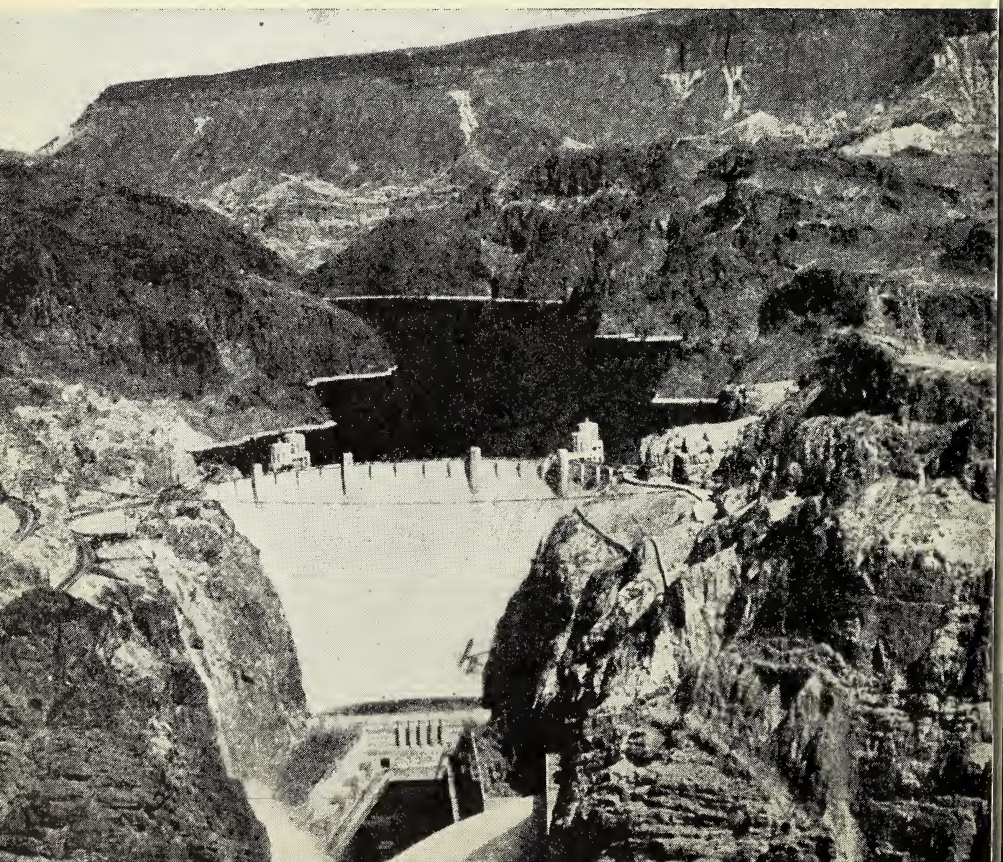
This loom is a modern one, and it is very complicated as you can see. It is made of steel, copper, brass, and other metals. Even expert workmen would have a very hard time making it of wood.

the making of just a simple article really required much more skill than the making of a wooden article. Iron and steel were used for weapons, armor, and hand tools. Copper, tin, and lead were used for kitchen utensils, for roofs and gutters on big buildings.

When people began to make machines of metal, the mines became very busy. Smelters were built near the mines because in those places iron and steel could be cheaply made. Then factories were started close by. And so places where iron was mined became manufacturing regions. As someone has said of England in this period, "Cities leaped into life in these places."

In the manufacturing regions of England there were not enough streams to supply power to all the factories

Above is an old-fashioned power dam and mill. The mill wheel is of wood and so is most of the mill machinery. Below is a modern dam. Its powerhouse contains steel machinery like that on page 323.



that sprang up. Another cheap and reliable kind of power was needed. And it was found in the steam engine! For some years inventors had been trying to find a way to get power from steam, and a steam engine for pumping water out of mines had been built and used. Then Thomas Watt, who had been working away for twenty years, finally made a steam engine that could be used to run looms, spinning wheels, millstones, and other kinds of machinery.

Lots of fuel was required to make steam for steam engines. Coal was the fuel used, and the men who owned factories naturally wanted to get it as cheaply as they could. More and more factories were built in or near coal-mining regions, where the cost for transporting coal would be small. In this way many places where coal was mined became manufacturing regions. Many factories were also built in places where both coal and iron were mined. Factory owners wanted to get machinery cheap, too.

The Industrial Revolution

All these inventions—the new machines and the new ways of making things—were very, very important. They changed people's ways of living so completely that we call this period of invention and factory-building the Industrial Revolution, because a revolution means a great change. *Industrial* has to do with work and workers.

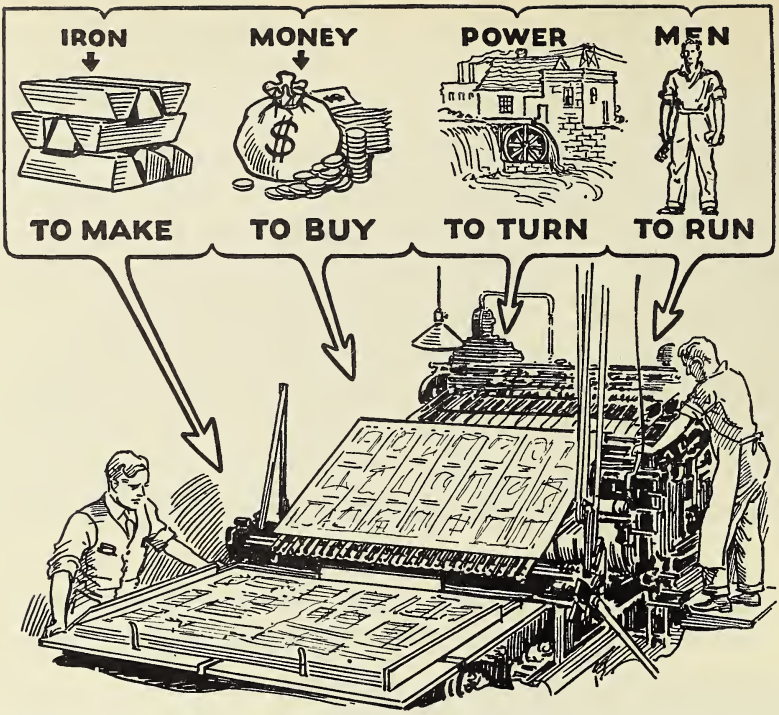
Four things were needed to bring about the Industrial Revolution:

Iron to make machines.

Money to buy the machines.

Power to run the machines.

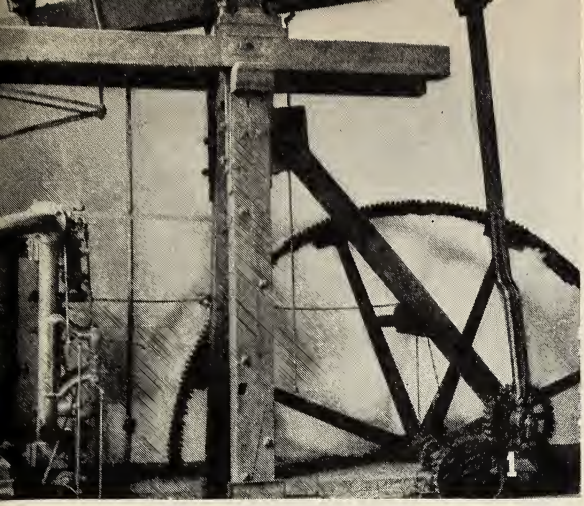
Men to operate the machines.

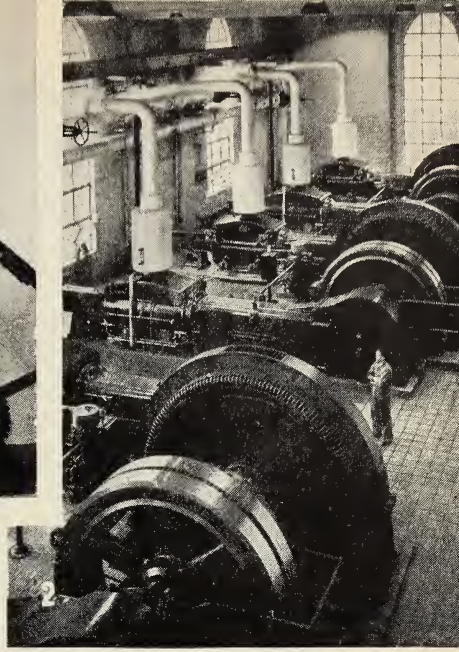


This drawing shows the four things that were necessary before there could be an Industrial Revolution.

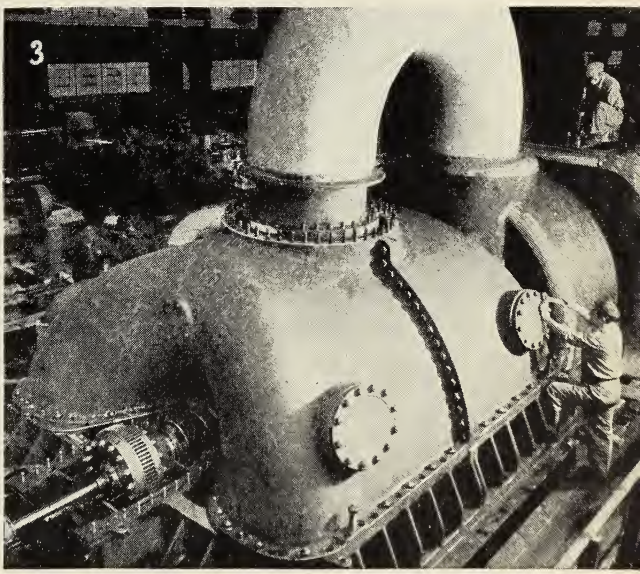
Because England had all these things, the English people changed rapidly from a nation of farmers to a nation of manufacturers many years before other nations changed. This didn't mean, of course, that there was no more farming in England—it just meant that many more people were engaged in manufacturing than in agriculture.

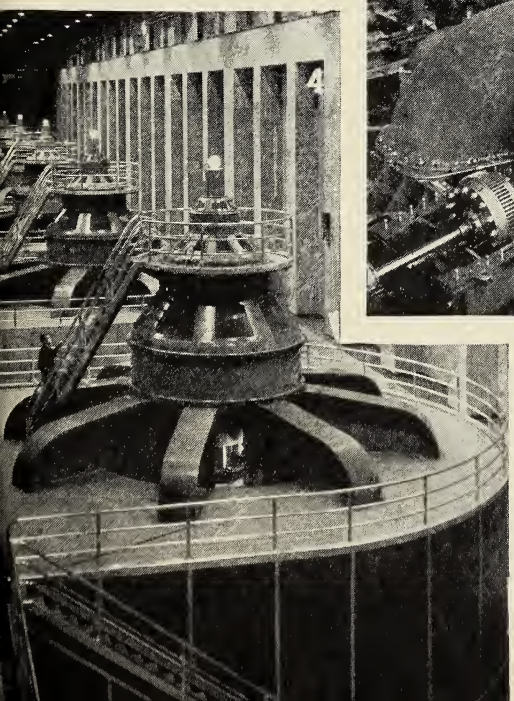
Since there was plenty of iron ore in England, the English people could make the iron and steel needed for machines. They had many small, swift-flowing rivers, as well as much coal, and so there was plenty of power to run the machines. There were many towns with people who wanted work, and so there were men enough to run the machines, or, as we say, there was a supply





Picture 1 shows a model of one of the first steam engines made. The other pictures show huge engines in use today in powerhouses and factories. You can see that this old engine had some parts made of wood. There is no wood at all in the other engines shown.





Perhaps your class can arrange to visit a factory that uses steam engines for power. A committee should make the arrangements beforehand. If you can also visit a factory that uses electric power you might discuss the differences you notice.

of labor. And last of all, English merchants and English craftsmen had made money in business. They were glad of a chance to spend this money to buy machines and start factories.

There was an Industrial Revolution in other European countries, too, but later than in England. In America the great industrial changes came about slowly, but once started they spread rapidly over the country. Just as in England, the Industrial Revolution here greatly changed the ways in which people lived. It changed the ways men earned their living.

Making Things in the American Colonies

THE FIRST settlers in America had to make a living by farming or hunting, or by doing both. You have probably read about the first settlers in Virginia and in New England, who had farms but also hunted for game in the forests and fished in the rivers. You have also read how the first towns grew up in places where ships from Europe could find a good landing. But the settlers did not depend on shipments of English goods. Ocean freight was very expensive and goods were scarce. In early days almost everything in the colonies was made by hand. People made things for themselves. The women and girls spun wool into yarn and wove cloth. They boiled grease and the lye from ashes to make soap. They molded candles of sheep's tallow and bayberries. They preserved fruits and vegetables and salted meat to keep it. The men and boys made wooden furniture, molded bullets of lead, and made gunpowder by mixing sulphur, saltpeter, and charcoal. They even turned out nails themselves by heating and cutting long thin iron rods which they got from a blacksmith. In all these ways colonial families—especially those in the coun-

Almost everything you see in this picture of a colonial room was made by hand. A blacksmith made some of the things but many articles were made by the people who lived in the house.

try—could get along without buying many things just as did the people on the manors in the early Middle Ages.

As the population grew, there was more and more need for things that were hard for the unskilled workman to make. Hunters needed weapons, farmers needed tools, fishermen needed boats, and skilled labor was necessary to make them. Craftsmen did the work that needed special skill. For instance, blacksmiths made tools and kitchen furnishings; shipwrights built boats for fishing and for carrying trade.

In many towns the citizens persuaded craftsmen such as blacksmiths and shipbuilders to settle there by offering them free land or by building them a house or shop. For instance, the early settlers of New London, Connecticut, gave a blacksmith a piece of land and built

him a house and shop. They even bought him a supply of iron and steel and paid his traveling expenses from Massachusetts. In much the same way the lord of the manor had offered merchants land if they would settle near the village or the manor house.

As the towns grew, other craftsmen came to them and made a living there. Cabinet makers turned fine wood into expensive furniture; coachmakers built carriages and coaches; tailors, milliners, and dressmakers made fine clothes. As people made better livings on the farms and plantations, they wanted nicer things to eat and to wear, finer furniture, more luxuries. And other people were able to make a living supplying these articles.

Most of the manufactured goods, however, came from Europe, especially from England. The rich tobacco planter in Virginia sent to England for fine china dishes and to Ireland for glassware. He had wine sent him from Spain and wallpaper from France. Silks came from Italy and France, but his woolen clothes were made of English cloth. The following articles appeared on an order that George Washington once sent to his agents in London:

1 Coat made of Fashionable Silk.
A Fashionable Cap or fillet with Bib apron.
Ruffles and Tuckers, to be laced.
4 Fashionable Dresses made of Long Lawn.
2 Fine Cambrick Frocks.
A Satin Capuchin, hat, and neckatees.
A Persian Quilted Coat.
1 p. Pack Thread Stays.
4 p. Callimanco Shoes.
6 p. Leather Shoes.
2 p. Satin Shoes with flat ties.
6 p. Fine cotton Stockings.
4 p. White Worsted Stockings.

12 p. Mitts.
6 p. White Kid Gloves.
1 p. Silver Shoe Buckles.
1 p. Neat Sleeve Buttons.
6 Handsome Egrettes Different Sorts.
6 yards Ribbon for Egrettes.
12 Yards Coarse Green Callimanco.

The first shipbuilders of New England had to buy sails for their boats in England. If a New England colonist wanted hardware for his kitchen or silverware for his table, he sent to England for it. If he wanted a spyglass or a watch, he had to order it from England.

It was not convenient for the American colonists to have to send so far away for what they wanted, but it pleased the manufacturers in England, who made much money selling manufactured goods across the sea. They wanted the colonists to produce only raw materials, such as lumber, tobacco, and hides, and send the materials to England where they could be sold and the money spent for English manufactured goods.

How Manufacturing Began in the United States

For many years, as you have just read, the colonists did little manufacturing, except of course in their homes. In all the length and breadth of the Atlantic seacoast there were only a few small factories, although there were, of course, many flour mills and sawmills. A man from Germany started a glass factory in Pennsylvania. An English workman opened an iron foundry in Massachusetts. Paper was made in New York. These products and the ones made in the other small factories were cheaper than English products that had to be shipped all the way across the Atlantic Ocean.

After the War of the Revolution the population of the United States began to grow rapidly. There were more and more people wanting more and more things and wanting them at cheaper prices. And there were many smart businessmen who saw that they could make money by building factories and manufacturing the things needed. That meant that more and more machinery was made, workmen hired, materials provided, and manufactured goods on the market. By 1840 things were really booming. American factories were turning out tools, hardware, glassware, cloth, leather goods, and hundreds of other articles that people wanted.

The first factories in this country were located on streams where water wheels could run the machinery. Many factory towns grew up on what is called the Fall Line. This is the place where the rivers which flow east from the Appalachian Mountains into the Atlantic drop from the foothills to the coastal plain. In early days many people looking for a good place to settle went up these rivers until they reached the falls and rapids at the Fall Line. Since they could go no farther by boat, many settlers decided to build their homes at this point. And so, when manufacturing became important, there were already a number of towns located at places where rivers could furnish a tremendous amount of water power. Richmond, Baltimore, Philadelphia, and Trenton are some of the Fall Line Cities.

There were many large towns and small cities in the northern states, and workers could be hired in large numbers, but in the southern states there were few towns, and almost everyone worked on farms or plantations. Besides, except for cotton and tobacco, the kinds of raw materials used in the factories were mostly found in the northern states.

Below the map is a diagram explaining the Fall Line. The white line on the map above shows the Fall Line, and the black dots along the line show the location of cities and towns that were built at places where there were falls or rapids in the rivers.

The same thing happened in the United States that happened in England. Iron mines and smelters were needed to supply metal for the tools and machines used in the factories. Iron ores had been mined in almost all the colonies, and there had been many small furnaces where iron was made. Valley Forge, famous because of the dreadful winter that Washington and his

troops spent there, got its name from a forge or furnace operated there in early days. But these forges did not make very much iron and steel. After the need for great quantities of iron came, men began searching for iron ore and found it in Pennsylvania, Ohio, and other states. The mines that were opened were soon kept busy.

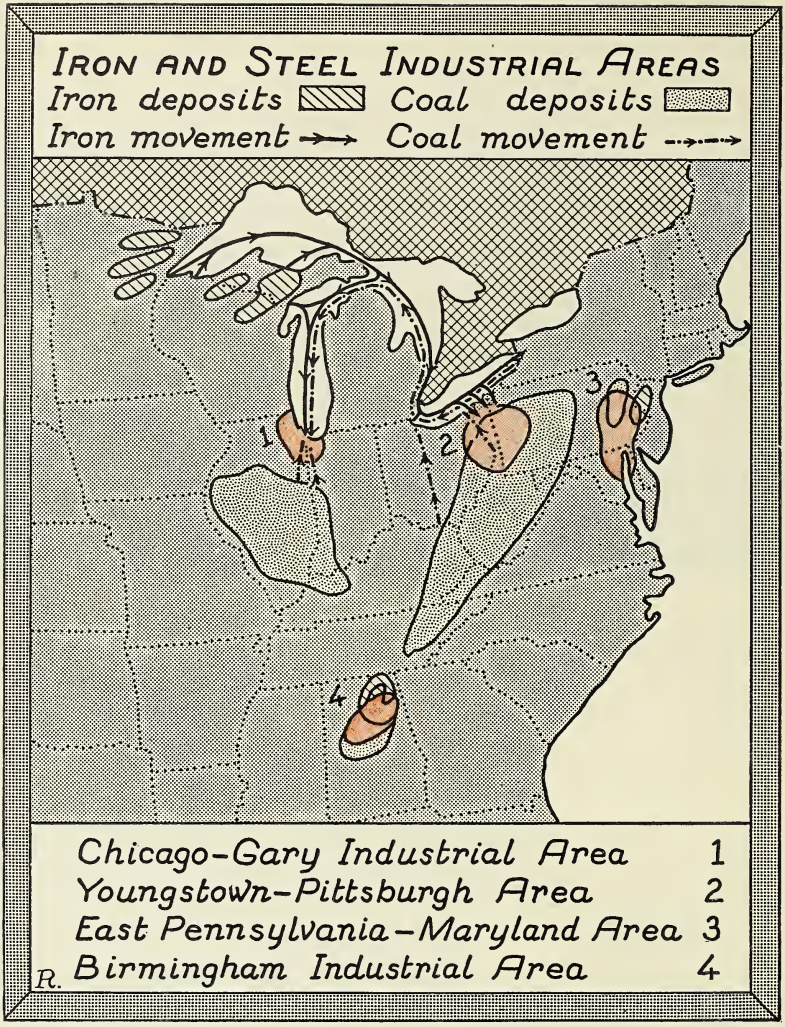
In the first smelters charcoal was used with the iron ore. Whole forests of great, fine trees were cut down and made into charcoal. For awhile it looked as if the eastern forests might disappear, just as the English forests had been cut down to make charcoal. But coal had been discovered in Pennsylvania and in other states, too, and manufacturers were learning that coal made a good cheap fuel for factories. More and more of it was used.

When the steam engine came into use to run machinery, factories could be located at other places than beside streams. With steam engines to provide power and more machines that turned out better tools, people were able to improve the machinery in their factories and mills. One improvement kept leading to another. It was indeed a busy time for inventors!

People had long wanted cheaper, faster ways of producing goods and now at last they had these ways. They had factories and in them swift-working machinery run by power. They had workmen to operate the machinery. The goods were turned out in great quantities by machinery instead of by the slow method of making things in people's homes with hand tools. The age of machines had come!

While Americans were building factories and turning out goods in greater quantities than ever before, they were also improving their roads and building new ones. Then locomotives were invented, and Americans began

Charcoal is still made and some is used for smelting certain fine kinds of iron, particularly in Sweden. The picture above was taken in Sweden. The men in the background are piling up wood. The boy is covering a pile with dirt, which helps to keep air from the burning wood. In the lower picture you see a pile that has been lighted. A class group could study charcoal and report.



The white spots on this map show places where there are many factories using iron and steel as raw materials. Study a railroad map and see if these places have many railroads.

building railroads. It was not many years before there was a network of railroads in the eastern states. Then raw materials could easily be shipped where they were needed and the manufactured goods shipped out to market.

These men are going to work in a great factory. There are enough workers in this one factory to make a good-sized city. The factory provides special places for them to park their automobiles and special viaducts so they can reach the buildings where they work.

Changes in Ways of Living

CHANGING the way of making things also changed the way people lived. Never before had there been such a great and sudden change in men's lives! When workmen made things at home, perhaps they did not make so many things, but each man worked for himself. He owned his tools and the simple machinery he used. He could decide how many hours a day he would work. He was his own master. Usually the workman owned his home and, if he lived in the country, had a garden in which he worked during his spare time.

The garden helped him make a living, especially in times when he could not sell what he had made.

Men who worked in factories could not live that way. They worked as many hours as the factory owner decided. In the first factories men worked from sunrise to sunset. It was many years before workmen were to have anything to say about how long they should work.

Men who worked in factories had to live near their work, or else they spent too much time in going to and from work. Since the factories were almost always in cities and towns, the workmen could not very well live in the country. Often they could not own their homes, because city property was expensive or because they could not be sure of keeping their jobs in a place. Because land in cities and towns was so expensive, very few workmen could have gardens. Even if they did have a small garden, they could not take time for garden work, because most of the daylight hours were spent in the factory. So most workmen stopped raising part of their own food and began buying it all with money that they earned.

You can see that the life of the workman was very different from what it had been. The Industrial Revolution had made a great change not only in his hours of work but also in his home and way of living. It also made a change in the life of his family. When men worked at home, the members of the family often helped them. Boys helped their fathers and learned the same trade. Girls helped their mothers with the housework. Frequently women and girls helped the men in their work, as, for instance, carding wool or spinning thread. They worked together for the sake of the family and the home. Everyone in the family had a share in the work. But often the man who worked in a factory was

not paid enough money to buy the things his family needed. And so the wife would often get a job in the factory, too. As soon as the children were big enough to work, they would get jobs, too. They helped because they had to or else not get enough to eat. The children often worked as long hours as men and women.

Improved Working and Living Conditions

Conditions are much improved today, because there have been still more changes in the way people live, especially in this country. We have laws forbidding children to work in factories, and also have laws that regulate the number of hours people are permitted to work. Many workers, both men and women, have their unions, which are something like the old guilds. The unions make bargains with employers and get them to agree about wages and the hours of work.

Finding a good place to live is still a problem for people who work in cities. But modern transportation is making it easier. By using busses, streetcars, railroads, or their own automobiles or bicycles men can live farther away from the place where they work than they could if they had to walk to work. Some men now live out in the country or in the suburbs, several miles away from the factory in which they work.

There used to be much sickness in cities and towns, especially where people were crowded together. In many factory towns the population increased so rapidly that houses could not be built quickly enough for all the workers. So a number of families would move into a one-family house and live together. Sometimes these families even took boarders. Many other people crowded together into cheaply-constructed tenements without sufficient plumbing or windows. Such conditions were not

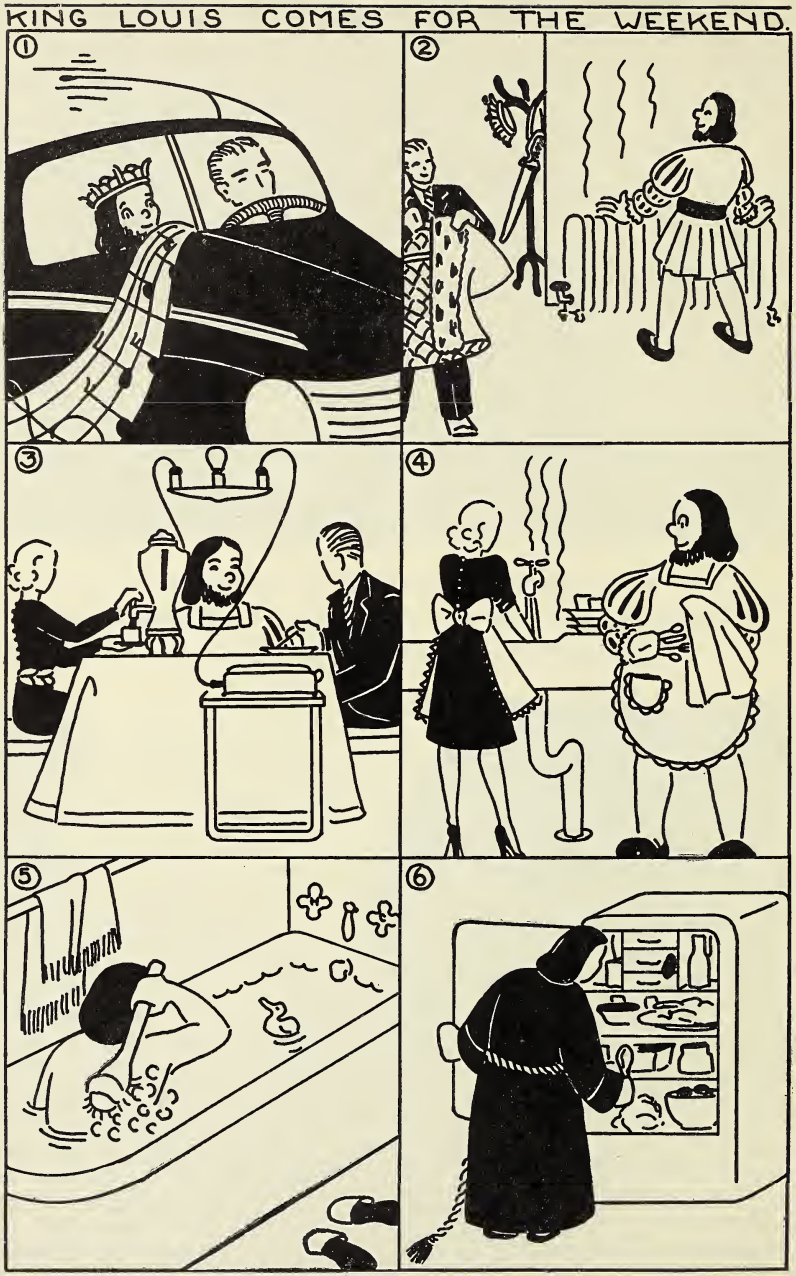
healthful, but in big towns and cities they were nearly always found. Too many children and young people died or else grew up weak and sickly.

Much is being done, however, to improve these conditions. In some places old buildings have been torn down and great modern apartments erected where many workers can be housed at low rentals. Playgrounds have been provided to keep children off dirty, dangerous streets. Doctors are studying the causes of disease and as a result people today know much more about how to keep well and live longer than their grandparents knew.

Today many workmen in the United States have homes with more comforts than the richest homes had a hundred years ago. In fact, many American workmen live much more comfortably than did the kings of France in their grand palaces, for their homes are comfortably and evenly heated, and have plumbing. Even

Buildings something like those you see on the opposite page were torn down to make room for these apartment buildings. The open place you see is not a street but a playground for the children.

Most cities have many blocks of old buildings like the houses in these pictures. People who do not earn much money often must live in such homes because rents of nicer places are too high.



You might try drawing some other pictures that would show how George Washington or Benjamin Franklin would be surprised if they saw how people are living today.

in small towns and in the country people can get electrical equipment that will do the work of several servants, and often do it better. Even a cheap old used car will carry its owner and his family faster, farther, and more comfortably than the costly coach of a king could have carried him one hundred fifty years ago. Because so many Americans live in comfortable, well-furnished homes, and because they have so many things to help them enjoy life, we say we have a high standard of living.

Among the many things we have are books, fine reproductions of good pictures, and radios—all produced by factories. Today people in this country can read books and magazines, see movies and listen to the radio. They do not have to remain ignorant or believe what someone has told them. Although many people can read about things and still not learn what is true, at least they have the chance to find out for themselves.

Before America was discovered, white men knew nothing of potatoes, tobacco, corn, squashes, tomatoes, Chili peppers, maple syrup, or turkeys, just to name a few things. Today we think some of these things are necessities. Once most fruits and vegetables were expensive luxuries in the cities—a child who found an orange in his stocking Christmas morning thought he was lucky. Now they are grown by modern methods, shipped long distances in fast liners or trains, kept cool and fresh by artificial ice, and bought cheaply by the person who wants them.

New Times—New Needs

ONE REASON we have so many new needs is that more people than ever before are crowded together in cities. City people must have pure water from wells, lakes, rivers, or great reservoirs. They need bathrooms,

This picture was taken more than fifty years ago. Homes did not have as many comforts then as they have today. This house was heated with stoves that burned coal. It was lighted by oil lamps.

special kinds of foods, ways to get fresh air and sunshine, and ways to get exercise. Life in a city where large numbers of people must live close together is quite different from life in the country where one family lives on a farm with no very close neighbors.

Today it takes more people working to supply the needs of any one of us than ever before. You have been reading how families once could make or raise everything they needed. But those families did not need or get very much, because the members of a family could not make very many things. The more things people have, the more things they need. Do you remember the example that was used early in this book, the example of the boy and his bicycle?

This American home of today has many more comforts than the home of more than fifty years ago. The family has electric light and furnace heat to make them comfortable. They have a radio, a telephone and a piano.

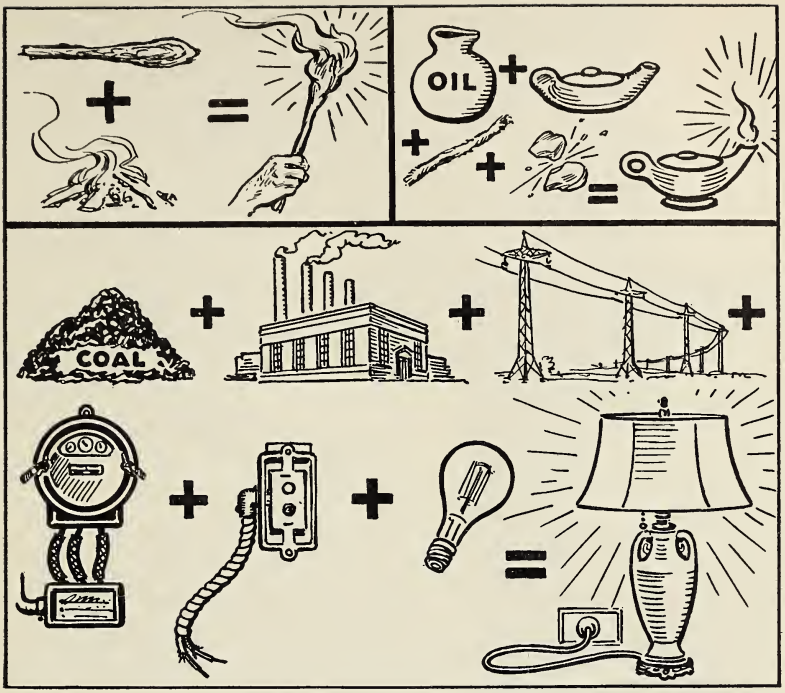
How many of the things your family needs could your father or mother or big brother or sister make out of raw materials? Could they make everything you use? Suppose you start with the new house you think you need, and see if the members of your family could make it. They would not find it easy to go into the woods and cut logs. They would not put the logs together and roof the house with thatch made of wild grass. Your house would be built by skilled workmen. They might use brick from Ohio, redwood from California, cement from Illinois, wallpaper from Maine, glass from West Virginia, copper from Arizona. It takes a great many people, working in many different parts of the country, and indeed of the world, to satisfy your need for a house.

One way to show how complicated it is to supply your needs is to think about light for a moment. When the cave man needed a light at night, he picked up a stick from the fire, blew on it until it blazed—and there was his light. It was all very simple, even if he had to hunt for pine sticks that would blaze up fiercely and carry them to his fire. He did all the work himself—he found the stick, broke it into the right size, lighted it, and used it.

When the Roman wanted a light at night, he used a clay lamp. The lamp was made by a potter and the olive oil, which served as fuel in the lamp, was pressed out by a slave from olives probably grown on the Roman's farm. There was a little wick in the lamp, made perhaps of a piece of linen rag that might once have been clothing, woven by another slave. Getting a light in Roman days was more complicated than with the cave man. It took the work of more people.

But with us, getting a light at night is very complicated, although it seems a simple matter just to touch a switch and flood the room with light. But the switch was probably made by factory workers in Schenectady, New York, and the wires in Chicago out of copper that was smelted in Ogden, Utah. The light appears in a glass globe made in a machine run by young women in Cleveland, Ohio. Inside the light bulb is a rare metal called tungsten, which was mined by Chinese laborers in far-off Asia. And the bulb would not light up if men were not working in powerhouses and sub-stations to make the electricity that is needed.

To the cave man, "I need a light," meant, "I need a burning stick." To the Roman, "I need a light," meant, "I need oil, a flat dish with a spout, and a wick." To us, "I need a light," means, "I need a powerhouse,

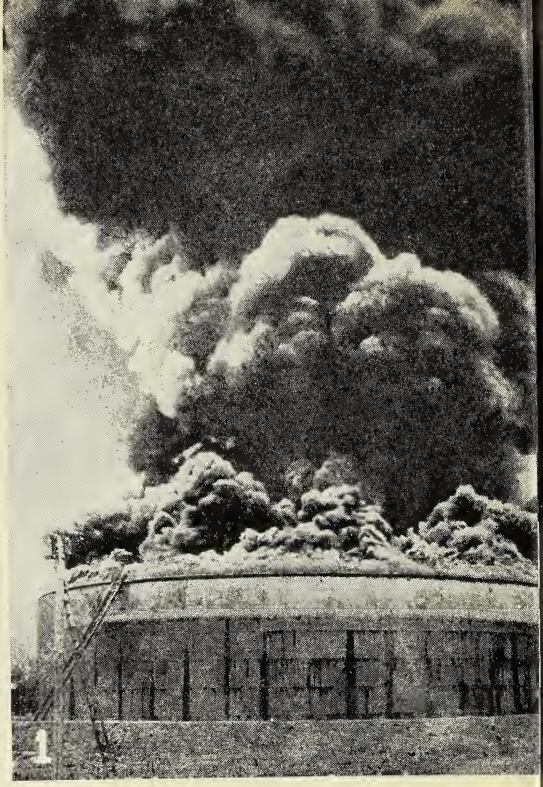


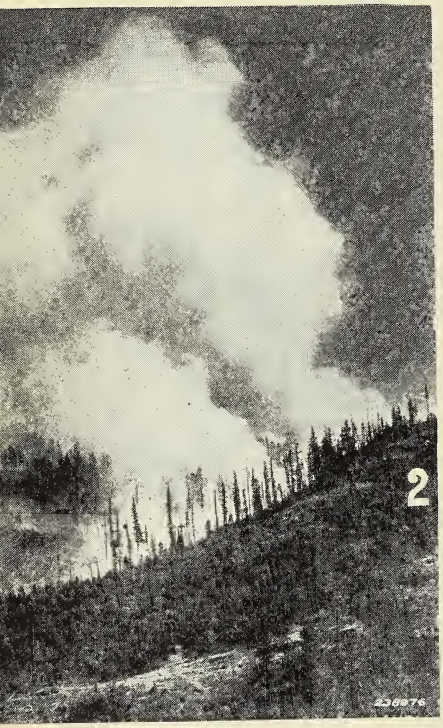
It would be interesting to make another series of pictures something like these pictures about light. This one shows how simple or how complicated it was for a cave man, a Roman, and an American of today to have light. You might make some pictures about such things as fire, a hammer, a boat, or other things people use.

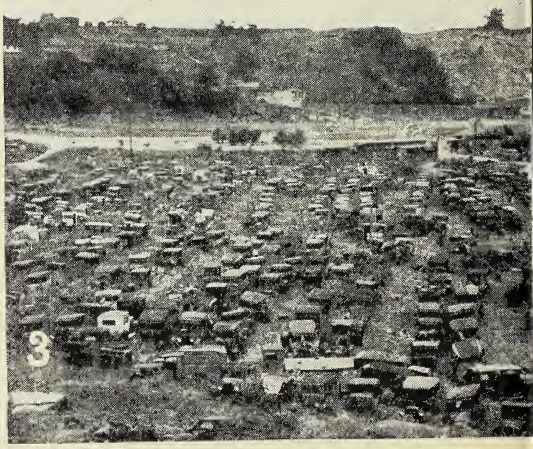
wires, a switch, a meter, a socket, a glass bulb, and several kinds of metal." It means that we must have the services of many electricians, miners, factory workers, salesmen, railroad and steamship workers as well as many hundreds of others you have never seen or perhaps even heard of.

It should now be plain to you that our needs today make more work for men and machines. That is one of the reasons why we have learned to make more goods with the help of machines. We have learned also to grow more food with less work. We take advantage of what people have learned by experience.

The pictures on this page and the opposite page show several different resources being wasted. Picture 1 on this page shows a large tank of oil on fire. Picture 2 shows a forest fire. Most of the automobiles shown in Picture 3 were wrecked. Picture 4 shows a factory district.

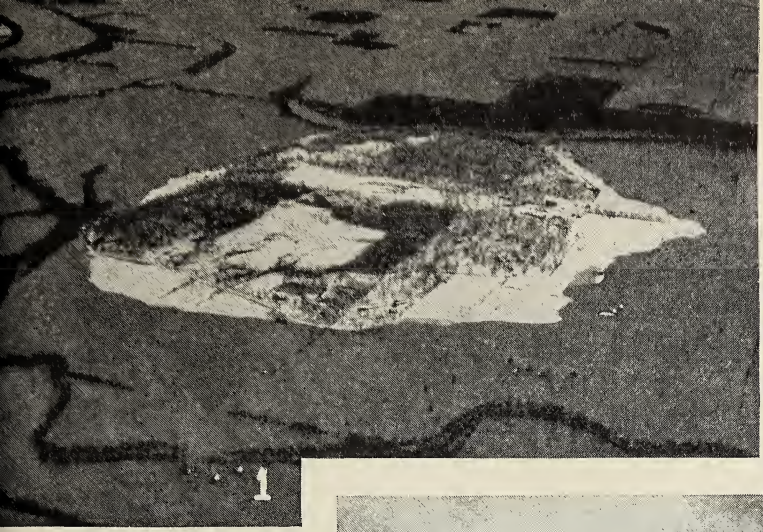




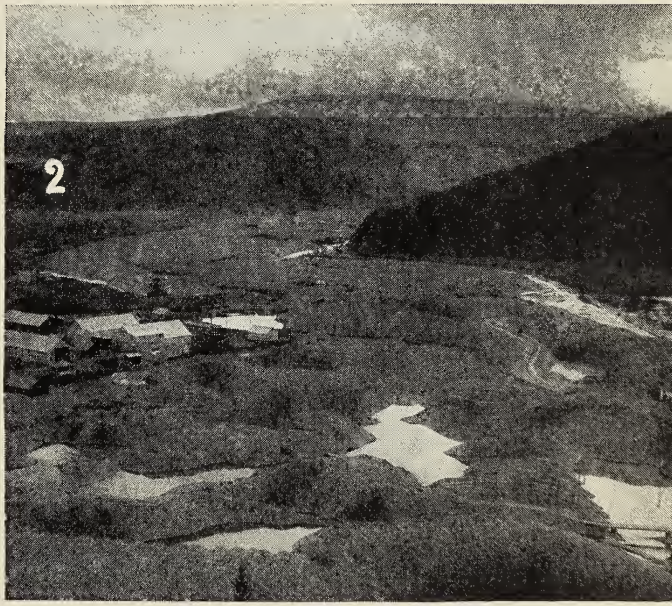


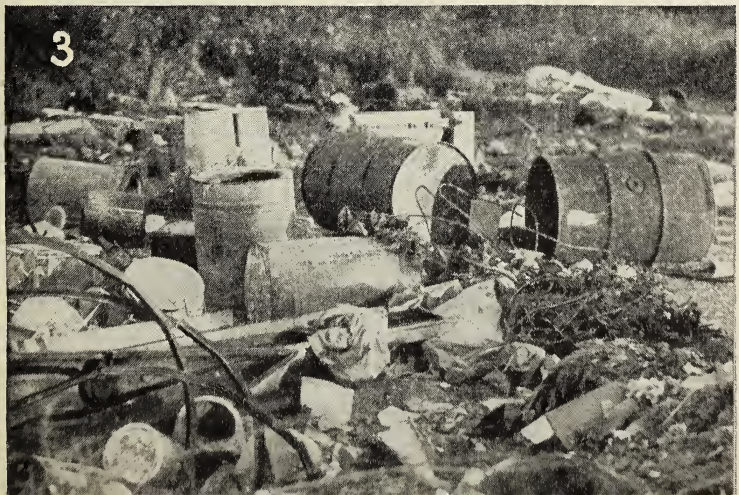
Perhaps you can find pictures that show other resources being wasted. If you have read this chapter and the others carefully, you will know ways to stop waste.

A good discussion about waste would be "How can people be taught not to waste resources?" Think of ways in which you learned things and see if you can use the same ways to teach people not to waste the resources of the country.



Picture 1 on this page shows many acres of land that have been flooded. The light part of the picture is a farm still above the water. Picture 2 shows land that has been ruined by dredging for gold. Land that has been mined by "strip-mining" often looks like this. Picture 3 is a garbage dump at the edge of a city.





Using Up Our Raw Materials

All this manufacturing means that we have been using up the raw materials of the world more rapidly than ever before. Some of these materials, of course, can be used over and over again. This is true of iron, gold, and other metals—if we are careful of them. But the iron in a farm machine that is allowed to rust away or in a great ship that is sunk at sea is not likely ever to be useful again to human beings.

Rich farm soil that is allowed to blow or wash away, and forests that are allowed to burn—these things are lost to us and cannot be replaced quickly.

It is wasteful to have houses, or highways, or clothing that are not well made for the job they have to do. It is wasteful for people to have property and not take care of it. Things can be wasted in small ways as well as in large ways. For instance, almost half of the wooden houses and barns in the United States are in need of paint and repair work. A building that is kept painted and repaired lasts longer than one that is neglected.

For many years men have given most of their thought to better and faster ways of turning raw materials into finished goods. We have not thought so much about seeing that everyone gets the goods he needs. For instance, there are still a number of things which add much to the comfort of living that are not made cheaply enough for many people to buy. For many years we didn't think much about making sure that we will always have a supply of raw materials. But we are beginning to think about these things and will have to think harder about them. We will have to figure out fair and just ways so that people can work under pleasant conditions.

Look back at the pictures on page 344 and page 345. Those pictures showed ways in which some of our resources are wasted. The pictures on this page and the next show some ways to save resources. Protecting resources from being used up too soon or too wastefully is called conservation. A good way for you to show that you understand something about conservation would be to describe these pictures to the class.

On this page: 1, A foundry yard full of old iron. 2, A levee along a river. 3, Lumbermen in a forest. 4, Foresters planting pine seedlings. On the opposite page: 1, Collecting food scraps. 2, A protected buffalo herd. 3, Forest ranger lookout station. 4, Saving old paper scraps.

Manufacturing Things We Need

In the chapters before this one you have read about resources which we use to satisfy our needs. The materials we use come from plants, from animals, and from minerals. In this chapter you have studied materials that had to be put together or changed in some way before we can use them. Cotton clothing has to be *made* from cotton. You cannot pick cotton and use it just as it comes from the plant, the way you can pick berries and eat them just as they come from the plant. A bicycle, for example, has to be made from many different things—from iron, rubber, and other materials.

In studying the resources of your region and the resources of other regions you have made lists of things that the different regions produced. Many of these things had to be *made*—manufactured—before you could use them. Do you live in a region where materials are manufactured into useful things, or in a region where materials are produced? Or are both these kinds of work carried on in your region? You might have a class discussion about your region and the regions near it. If you have such a discussion, a large map of your region drawn on the blackboard will help. You might show the manufacturing places in your region by drawing small factories on the map. You can use other symbols for the places that produce materials.

In your discussion about your region, it might be very interesting to talk about what would happen if the animals of the region were killed, or if the soil was washed off or blown away, or if all the minerals were taken from the earth. Any one of these things would have some effect on your region. What do you think the effects would be?

To show that you understand the difference between producing raw materials and manufacturing these raw materials into useful things, suppose you write a paragraph about your own region. If there is manufacturing in your region, tell if the manufacturing depends on materials from your region or from other regions. If there is little manufacturing in your region, try to find the reason for this.

Each member of the class might make a picture chart about some manufactured thing you use. One pupil might make a chart about bicycles, another about refrigerators, another about knives, or stockings, or tin cans, or any manufactured thing. The picture chart would show the important steps in making the article. For example if you selected a tire, you would need, first of all, pictures of the raw materials that go into a tire. You would want a picture of a cotton field and a grove of rubber trees. You could have other pictures showing what is done to these materials before they are made into the completed article. If you like to draw and make pictures, perhaps you would rather make the chart with your own drawings instead of using pictures clipped from magazines and newspapers.

Another thing you could do to study manufacturing would be to take one of the charts just mentioned and discuss it in class. Talk about the kinds of work that must be done to make the article shown on the chart. Make a list of the different workers that are needed. Do not include the workers in the office or the salesmen, but only those who have done some work in making the article.

Perhaps you can arrange to visit a factory. If you do, you will need several committees. Besides a committee to make the arrangements for the visit, you might divide

the class into several groups that will find out about the raw materials the factory uses, the places where the raw materials come from, the transportation used for the materials. Other committees should find out about the power used in the factory, where the factory sells the things it makes, what kinds of transportation are used to get the finished articles to the people who buy them. Before the committees start their work, the members should get together and make a list of questions they want to ask.

When committees have obtained the information wanted and are ready to report to the class, they can make their report in a number of ways. One way is for the committee to hold a discussion in front of the class. They can use maps or drawings or cartoons. A good way to show simple maps or drawings is to use a slide projector. The maps or cartoons or other drawings can be made right on the etched glass slides with plain or colored pencils. These slides are $3\frac{1}{4} \times 4\frac{1}{4}$ inches and cost only a few cents. They can be used over and over. Slides make it easy for the entire class to see what it is that the speaker is talking about.

If you look through magazines, you will find a few advertisements of organizations such as chambers of commerce. These advertisements invite manufacturers to build factories in the regions where the chambers of commerce are. See if you can find such advertisements. Many of them are put in the weekly magazine called *Time*. If you find some, make a list of the reasons given in the advertisement to persuade manufacturers to move to that region. You might write a few paragraphs or hold a discussion that would answer the following questions:

1. What people are there in that region who need and want what this factory makes?

2. What transportation is there to bring raw materials and to take what the factory makes to the people who buy it?

3. What raw materials are there in that region which can be brought to the factory?

4. What kind of power can be furnished to turn the wheels of this factory?

5. What is the supply of workers to run the machinery?

Maybe you would like to do some outside reading to learn more about manufactures in which you are especially interested.

To learn about how silk is made, read:

Europe and Asia by Barrows, pp. 68-69; 172-173
Science at Home by Patch, pp. 304-320
Story Book of Silk by Petersham
Japan, Korea, and Formosa by Tietjens, pp. 95-99
Children of Sunny Syria by Dodds, pp. 50-64

To learn about how paper is made, read:

Man and His Records by Barnes, pp. 106-108
Stories in Trees by Curtis, pp. 44-46
Canadian Ways by Harris, pp. 72-79
Story of Books by Maxwell, pp. 13-19; 24-31
Heels, Wheels, and Wire by Rogers, pp. 37-38

To learn about cotton and cotton manufactures, read:

Journeys Through North America by Stull, pp. 110-112; 128-130
Cotton Book by Pryor
Cotton and Other Useful Fibers by Allen, pp. 8-189
Social Studies, Intermediate Grades, Book Two, by Bruner, pp. 385-420
Growth of the American People and of the Nation by Kelty, pp. 219-222

To learn about iron-making, read:

Moving the Earth by Burton, pp. 28-54

Story of Mining by Gruening, pp. 150-153
Machines by Hartman, pp. 24-32
Steel Book by Pryor
Stories of American Industry, U. S. Dept. of Commerce, pp. 9-12

Craftsmen and Assembly Lines

In every community there are craftsmen who make things by hand. Most of them use very little machinery. There are cabinet makers, watchmakers, upholsterers, and others. Perhaps you might visit the shop of one of these craftsmen. He might be willing to tell you how he learned his craft, whether he served an apprenticeship and how long, and what he thinks about making things by machinery. He may give you reasons why he thinks hand work is better than machine work.

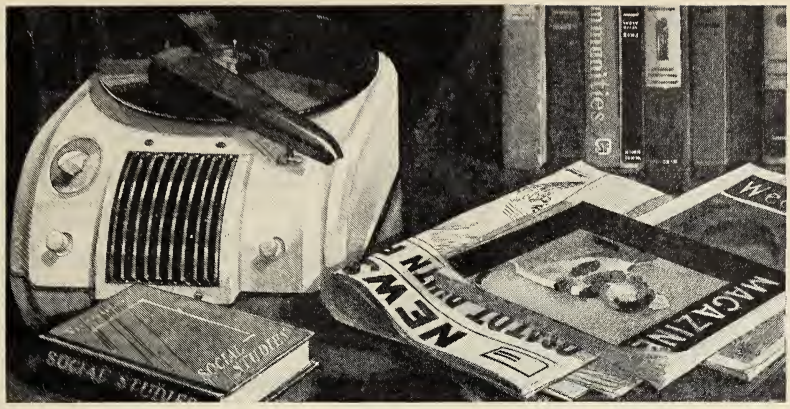
You may have heard of assembly lines in factories. In the magazine *Building America,* Vol. 1, No. 2, page 15, is a picture of the assembly line in an automobile factory. Perhaps a committee can make a report to the class about the way assembly lines in factories help to supply us with things more easily and cheaply.

Here are some more words to add to your glossary. If you understand these words, you will understand this chapter on manufacturing more clearly.

craftsman
journeyman
industrial
raw material
power
guild
revolution
apprentice
serf
Fall Line

CHAPTER EIGHT

A WORLD OF USEFUL THINGS



Every home contains useful things that have been manufactured.

Animals, Plants, Minerals

Let us go back again to the story of the man who went into the Maine woods and lived for two months as Indians did long ago. As you will remember, he was able to provide himself with food, clothing, and shelter by using just what he could find in the forest. The resources he used gave him only the barest living. Perhaps he could have lived more comfortably if he had been able to make better use of the resources that were there. After all, we get everything we use in our civilized life of today from the resources that are around us.

The man in the Maine woods used the wild animal resources there to supply him with much of his food. We also use animal resources for food, but we do not have to rely upon catching wild animals as he did. We can use tamed flocks and herds. These flocks and herds are a very valuable resource of ours, as you may realize when you find out that people in the United States eat more than sixteen billion pounds of meat a year. That is a good deal more than one hundred pounds of meat

per person. We also use vast quantities of milk and other products coming from dairy cattle.

The hides of the animals which the man in the Maine woods killed supplied him with some of his clothing. We, too, use the fur of wild animals, but our flocks and herds supply us with a far greater variety of material for clothing. The wool of which your coat is made and the leather in your shoes came from our flocks and herds.

Our animals supply us with something more than food and clothing. The parts of an animal which cannot be used for eating or wearing are turned into many useful things. The man in the forest used a deer's horn for a knife and its sinews for lacing his clothes. But our meat-packing houses—which are one of our resources, too—turn out about a hundred and forty products from the waste parts of animals. When you glue

The animals in the world are one of our resources.

something, or button your coat, or wash your face and hands with soap, you are probably using some of these products.

The man in the forest also used the wild plant resources he found for food, clothing, and shelter. He ate roots and berries and chewed different kinds of buds and barks. He wove the lining from cedar bark into moccasins and leggings. He made a shelter of sticks, boughs, bark, and moss. We, too, use plant resources for food, clothing, and shelter, but we do not have to depend entirely upon the plants we find growing wild, for we have a great variety of tamed plants that men have planted and cared for.

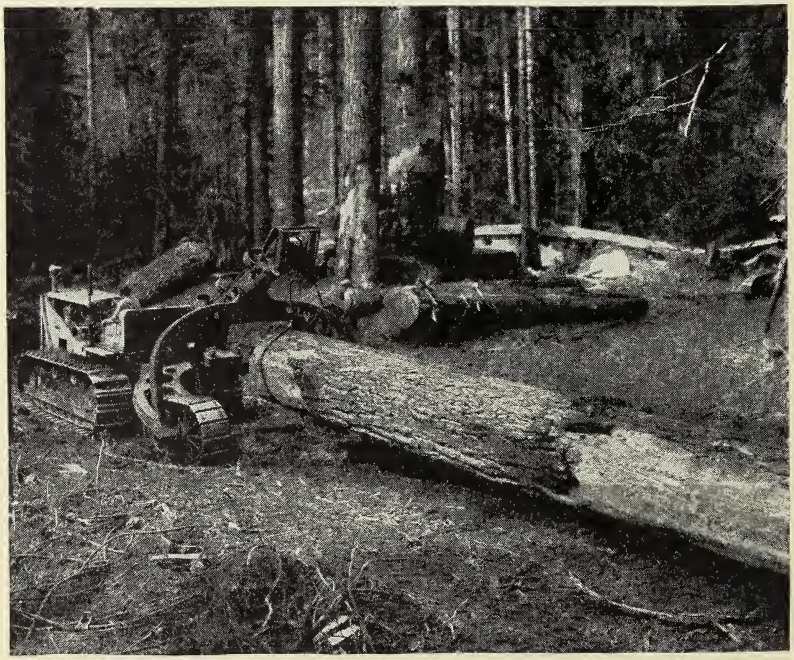
If you make a list of the different plant materials used in preparing your breakfast, luncheon, and dinner yesterday, you will realize how much we depend upon

Growing plants of all kinds are resources, also.

tamed plants. For breakfast one family might have grapefruit or oranges, cereal made from corn, muffins made from wheat flour, and jam made from sugar and strawberries. The grown-ups probably would have coffee made from the seeds of the coffee tree. Imagine how difficult it would be if people, especially those living in the city, had to go out in the fields and forests and hunt for these plant materials. Fortunately men have tamed most of these plants and can grow them close to the place where they are wanted. And so the cultivated fields and orchards are a resource of ours as well as the plants that are grown in them.

Two of our tamed plant resources provide materials we use for clothing. These materials are cotton and flax. Those who live in the Southern states, or have visited there, have probably seen cotton growing. The

Trees are an especially valuable kind of plant resource.

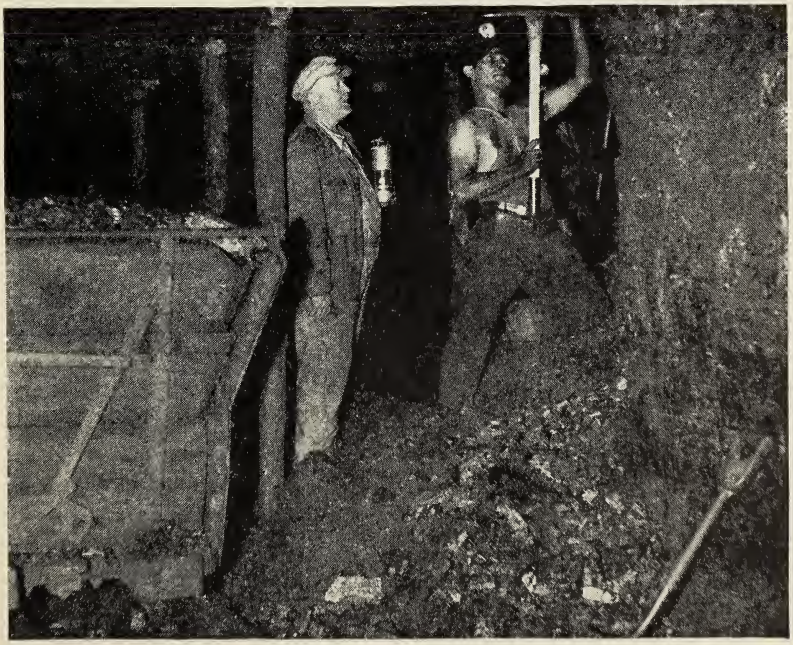


cotton fields and the cotton in them are a resource upon which people almost everywhere depend for some of their clothing.

Forests, such as the one in which the man lived for two months, are a resource. They supply us with lumber for buildings, for making furniture, pulpwood for paper, materials for tanning leather, and many other things as well. Men are continually finding new uses for forest materials. Ask someone who knows how the textile called rayon is made, and you will discover one of the new uses for wood.

The man in the Maine woods used a sharp-edged stone for a knife. Stone was the only mineral resource that savages had for many thousands of years. Today we have the use of many minerals, many of them much more difficult to obtain than stone. And we use

Mines, quarries, and wells are also resources.



these minerals for many different purposes and often in very complicated ways. All our mineral deposits and all our mines are rich resources which we could not do without. For instance, what do you think would happen to our businesses if no more iron were mined?

Resources That Men Make

THERE were other resources the man in the forest was able to use, resources besides the animal, plant, and mineral materials he found. Some of them he made as he went along. For example, in walking back and forth between his shelter and the berry patch, he marked out a trail. That trail was worth something to him. Without it he could not have gone so easily and directly to a supply of food.

We could scarcely get along without roads and highways.

Perhaps you have never thought of the sidewalks and paths you use as resources. But if you had to get along without sidewalks or paths, you would soon make up your mind that they were useful resources. It would be even harder to get along without streets. If there were no streets, we could not very well ride in automobiles, busses, or streetcars.

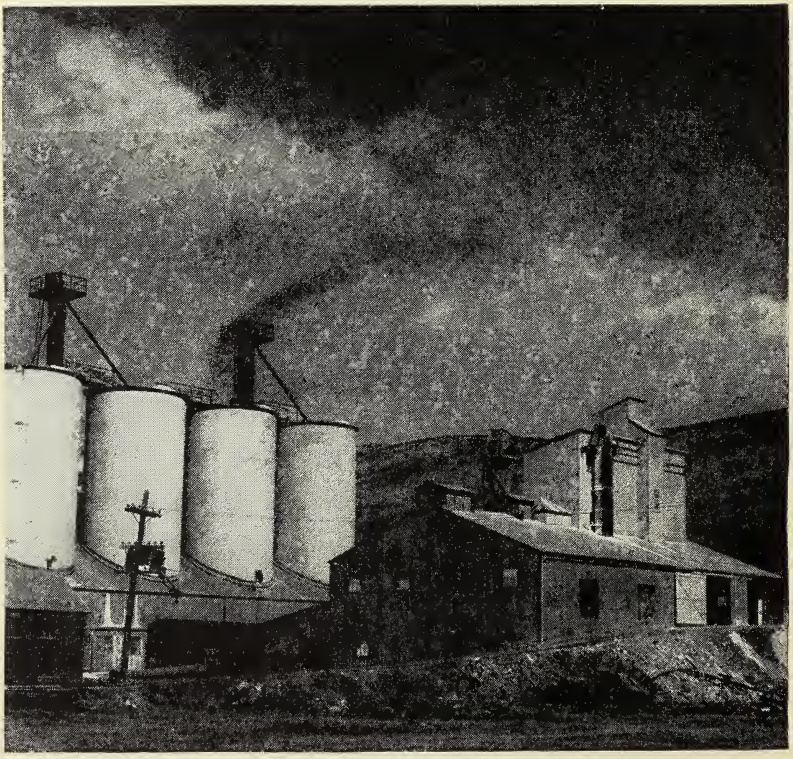
All our walks, streets, highways, and railroads are resources. And so, too, are the rivers and waterways on which goods can be carried in boats. Everything we use for transportation—automobiles, trucks, trains, airplanes, barges, ships—all these are resources. Your father's automobile is a resource for you and the members of your family, for it helps you to go where you

Buildings, too, are necessary.

want to go quickly and easily. In the same way your bicycle, if you have one, or your roller skates are resources.

One of the things the man in the woods did was to smoke some of his meat in order to save it. Then he would be sure of having something to eat on days when he could not find fresh food. That saved-up food was a resource—something that would help him live comfortably in time of need. And so the jars of vegetables and of jelly that mothers put up in summer and store away for use in winter—they are resources, too. And so are all the things that are gathered together in stores. The stores themselves are resources. And the money with which we buy the things sold in stores is a resource.

We could not make use of our natural resources without factories.



Have you ever thought of the nickels you spend for candy bars as a resource of yours? Well, they are, because they enable you to get something you want, to satisfy a need you have. Just as your nickels are a resource to you, the money which your father earns is a resource of your family.

The rough stone with the sharp edge which the man in the forest used as a tool was one of his resources. It helped him in his work of making a living. Without tools to work with we could have no progress in making things. Can you think of anything in your house or in the school which was not made by some kind of tool or machine? Tools are one of our greatest resources.

Sometimes we use things as tools without realizing that we are doing so. Perhaps you are holding a pencil

And the tools used to work on the resources are necessary.

in your fingers this very minute without having any idea that you use it as a tool. Isn't a pencil a tool when you use it to do arithmetic? Isn't the spoon that your mother uses in beating up a cake a tool? She is using it to make something. You can even think of your hands as tools when you are using them to work with.

More and More Resources

THE WORD resources has been used many times in this book to mean the raw materials that we get from minerals, plants, and animals. These are natural resources and are very important because we must have them in order to keep alive. Early man used only a few of these raw materials, and he used them in a crude way. But because people have been continually finding out things for ages, today we are able to use thousands of these resources in thousands of different and complicated ways. Undoubtedly a hundred years from now people will be using resources that now are unknown, and using them in newer and more complicated ways.

Before the raw materials which we get from plants, animals, and minerals can be turned into manufactured goods, men must use the great natural resources which supply us with power or energy to run machinery. The resources from which we get the most power are coal and oil. Burned as fuel in boilers, coal or oil is used to make steam which runs the engines in many factories. Steam is also used to turn dynamos, which make electricity.

The power which coal and oil can supply is used in other ways besides running factory machinery. Have you ever counted the number of cars in a freight train while you waited for it to pass by? As the locomotive puffed by, you could see what furnished the power to

haul all those cars. When the fireman shoveled coal from the tender to the firebox under the locomotive's boiler, he was using coal to produce power. The coal in the tender of that locomotive was a resource, and so are all the coal mines and all the deposits of coal that are not yet mined.

Perhaps you live where oil-burning locomotives are used. In the same way oil is a resource, and all the oil wells and oil fields of the world are a great resource. If you ever run out of gasoline on a lonely country road, you will soon understand that gasoline and other petroleum products are resources, as well as the pipe lines that carry petroleum and the refineries that change it into useful products.

Falling water is another source of power. You have already read how water power was used to turn the

A locomotive is one kind of power.

machinery in many early factories. But today it is not necessary for a factory to be located beside the falls from which it gets its power. That is because the water power can be turned into electricity and sent over wires for long distances. That electricity can be used for power in homes and factories. It is used for lighting, to run sweepers, toasters, fans, irons, refrigerators, and many other kinds of appliances in homes, and to run motors in factories.

Coal, oil, and falling water are the most important sources of power today, but you must not forget the kind of power that was once the only kind men had. Muscle power! If you visit the freight platforms in some railway terminal when freight cars are being unloaded, you will see many workers using their muscles.

A waterfall furnishes another kind of power.

If you watch a farm worker loading hay, you will see a fine display of muscle power. You, yourself, every time you shovel snow from the sidewalk, or cut the grass, or hoe the garden are using muscle power. In spite of all the other kinds of power that men have, they will always need to use some muscle power.

We have used our resources of coal and oil in a very wasteful way, and unless we are careful, they may be exhausted some day in the near future, much sooner than they should. Scientists and engineers know this and have been trying to find new ways of making power. Some have been trying to use the heat in the rays of the sun, but so far the sun engines they have built do not supply much power. Other engineers have been

And muscles also furnish power.

working with the idea of using the power in the tides. Other men think that freezing water could be used as a source of power. When water freezes, it expands and exerts great pressure. Perhaps you have seen water pipes that have been burst by freezing water. Some day, someone may find a way to use one of these sources of power.

The factories and mills where machinery turns and is used to make goods out of raw materials—spinning mills, flour mills, steel mills, sawmills, shoe factories, furniture factories—all these are resources. And so are the machines that different kinds of power keep humming in factories and mills. The huge looms that turn out cloth faster than a whole village of hand weavers could have done are resources. The buzz saw that eats through a great log as if it were nothing at all is a resource. The giant crane in a steel mill that lifts tons as if they were pounds, and the machines that are used to make machines—all machinery that is used to turn out manufactured goods—are important as resources. We could not get along without that machinery and lead our civilized lives.

Are There Other Resources?

Is there anything that isn't a resource? That is not an easy question to answer. Of course, you can say that if we have use for a thing, then that thing is a resource. But at one time, long ago, people had no use for coal and so didn't think of coal as a resource. Coal was just a worthless kind of black stone to them. Today, though, we value coal as a resource. Perhaps there are unused rocks that people will value a hundred years from now. Perhaps tomorrow, or next month, some inventor will find a way to make rubber from some common weed. Then we will think of that plant as one of our

resources. And so it is really hard to say whether or not something is a resource.

Perhaps an easier way to look at it would be to decide whether or not this particular thing satisfied some need we have. After all, what people want is to have their needs satisfied. Certainly a savage does not need many resources to satisfy his few simple needs. But we have many resources to satisfy our many needs.

You have probably read about communities where people live a rather simple kind of life. The Lapp herdsman gets along with very few resources. As long as he wants only simple food, clothing, and shelter, he can find everything he wants close to where he lives. But when he begins to want coffee to drink, and colored yarn for his mittens, he must depend upon other people. In the same way, the Zuñi Indian could manage to live and satisfy most of his wants by using what he could make or raise or find close to the Zuñi village. But the Zuñi Indian has learned to want bright-colored shawls and axle grease and iron bedsteads. He must depend on white people for these things.

As soon as these peoples' wants increased, as soon as they began to want or need more things, they had to use more resources. The Lapp began to make use of resources in Brazil and other places where coffee is grown, to say nothing of the railroads and steamships that carried the coffee to his land, and the people who helped with their work. The Indian made use of resources, such as cotton fields, petroleum refineries, iron foundries, railroads, stores, and a thousand others he probably never thought about.

It is much the same way with us. We do not lead very simple lives, as people do in some of the South Sea Islands. We want ever so many more things, like

the boy with the new bicycle. He wanted a tool kit and a siren. We keep wanting more things all the time. People wanted automobiles, and then, after automobiles were made, there had to be garages for them, filling stations, concrete highways, tourist camps, automobile radios, car heaters, and hundreds of other things. Do you see how one thing led to another?

Each one of these needs was satisfied by making use of resources. Take the highways for example. When people with automobiles and trucks insisted on having better streets and highways, we did not know so very much about building fine paved highways. But we used our resources, our trained engineers, our workmen, our road-paving machinery, the factories where cement was made and where stone was crushed. We learned to make good paved highways that would stand lots of traffic.

That wasn't all. The cement manufacturers who made the cement for making concrete knew that road builders needed better cement, cement that would harden faster and last longer. They used the resources of chemical manufacturers, and new materials were discovered that could be mixed with cement. And the road builders were not satisfied with the machinery they had. They needed machines that would prepare the roadbed better, lay the concrete faster, and help make all the work faster and better. They used the resources of the machinery manufacturers to get better machines made. And these manufacturers used the resources of the steel business and the gasoline-engine business to help them to get stronger materials and engines. Do you see how one want led to more? Perhaps you can think of examples like these, right in your own community or your own home.

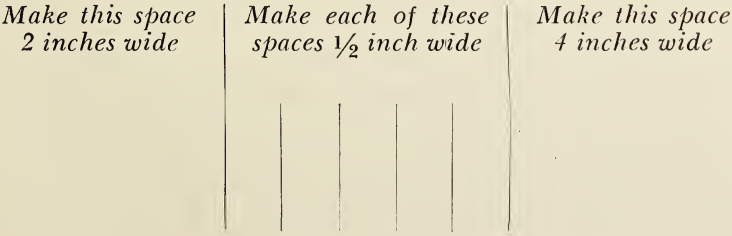
The important thing to understand about peoples' needs and the resources of the world is that so far there have been resources to satisfy the needs. As people learned to want more things, someone found resources that would supply them. When enough people want something, when they have a great need, a way is almost always found to satisfy that need. Sometimes months, or even years, may pass but sooner or later the need is satisfied.

All this means that the world is simply full of resources we can use. It does not mean that we can afford to waste any of them, for waste is a foolish thing. But it does mean that we have discovered ways to use these resources in order that people may live comfortable and happy lives.

Satisfying People's Needs

You have made several lists as you studied different chapters of this book. Suppose you make one more list of the things you need in order to live comfortably. This will be made in a different way and making it will help you to understand better some of the ideas you have learned.

Take a piece of paper 8½ inches wide and with a ruler make lines straight up and down the whole page according to the following diagram.



Rule lines across the page so that you can write in these headings:

What I Need	*2*	*3*	*4*	*5*	*6*	*Other Resources Used*

At the head of the first column write: What I Need.
At the head of Column 2 write: Does it come from animals?
At the head of Column 3 write: Does it come from plants?
At the head of Column 4 write: Does it come from minerals?
At the head of Column 5 write: Does it have to be made?
At the head of Column 6 write: Is it produced in this region?
At the head of the last column write: Other Resources Used.

In the first column you will write down the names of the things you decide you need. For example, suppose you decide to put down *Cotton Dress,* or *Cotton Shirt.*

In Column 3 you will put a cross X because the material in the shirt comes from plants. You will put another cross in Column 5, because the cotton must be made into a shirt before you can use it. Now you must decide whether or not to put a cross in Column 6. If cotton is grown in your region, or if shirts are made in your region, you could put a cross in that column.

The last column is there to help you get the idea brought out in this chapter. You have learned that there are many kinds of resources besides the raw materials we get from plants, animals, and minerals. The last column

is for *one* of the many other resources. For a cotton dress or shirt you might put down the labor of the people who picked the cotton, or railroad transportation, or electric power that ran the machinery in the factory. There are many resources for you to select from. Put down just one of them, and for the next need you can put down one of the others.

Now go ahead and make out the list. Probably your list will be much more complete than the one you made out when you read the first chapter. You will add many things you did not think of before. Perhaps the class would prefer to make out a big list and put it on the blackboard instead of having each pupil make a separate list. If you do that, you can discuss each need and the resources used. The discussion should help you to understand these five things:

1. That plants, animals, and minerals furnish us the most important raw materials.
2. That many of the things we need have to be manufactured before we can use them.
3. That we depend on other regions besides our own for many of the things we need.
4. That we must depend on trade and transportation to bring us things that are not produced in our region.
5. That there are other kinds of resources which are important in satisfying our needs.

You have learned in this chapter that people usually find a way to get the things they must have and that when enough people want a thing, a way is found to meet their need. Men needed better kinds of machinery than the bulky old-fashioned machines that had many parts of wood. That need was met by making the machines of iron and steel. This meant using more iron than ever

before. Perhaps you have wondered what would happen if all the iron was used up? How could people make machines? Suppose all metals were used up? How could we make the many things that are made of metals today?

Of course all metals won't be used up for many hundreds of thousands of years, and perhaps they never will be. But even if some of them were used up, we could now meet many of our needs without them. For example, chemists discovered how to make *plastics*, a new kind of material. Now manufacturers make many kinds of plastics, and some of them are taking the place of metal. Look up plastics in your encyclopedia and see if your library has magazines that have articles on plastics that you can read. Make a report to the class telling how plastics are made,what they are made of, and how some of them are used. Perhaps you can make a small display of some plastic materials. This project should help you to see that people can often use one kind of resource in place of another.

The class might find it interesting to have a debate after hearing the report on plastics. Those on one side might argue that it is all right to use up a resource, because men will find something to take its place. The other side will have to find arguments to prove that we must not use resources carelessly or unwisely.

Here is a list of some things. Copy this list on a sheet of paper or on the blackboard if the whole class works together. Write the list in Column 1.

1	2	3	4	
trees				
coal				
aluminum				

1	2	3	4	
cattle				
iron				
limestone				
rubber				
deer				
wheat				
waterfalls				
petroleum				

Put a cross X in Column 2 if you think the thing in Column 1 was a resource of the American Indians before the white men came. Put a cross in Column 3 if you think the thing was a resource to the peasant who lived on a manor in the Middle Ages. Put a cross in the fourth column if you think the thing is a resource to an American living today. You should be able to give a reason for putting the cross in any column or for not putting it there.

This last project, as well as others in the book, should have helped to make clear to you that changes are always taking place. The modern American uses more resources than the peasant used in the Middle Ages. The peasant used more resources than the savage of long ago used. Your class might finish up your study of resources and how men use them, by having a discussion about changes. The class could be divided into groups, and each group might present a report, prepare slides, pictures, or maps, plan an exhibit, or give a dramatic sketch. Here are some of the many subjects the groups might want to work on:

1. Some inventions are made because people's wants and needs keep changing.

2. Some inventions are made because other inventions have been made.
3. Sometimes inventions are made because new plant, or animal, or mineral resources have been discovered.
4. Inventions have had a great deal to do with changing the way people live, the kinds of houses they live in, the clothes they wear, the food they eat, and the kind of fun they have.
5. Education has an important part in furnishing new tools and new ways to work, in finding new resources, and in discovering new wants.

A Chapter for Teachers

This Useful World is written primarily for children of middle-grade reading ability, but it can be used by pupils in upper grades with success, for its emphasis upon individual needs and the resources which nature has provided presents many challenging aspects to older children. Although the book is a part of the Social Studies Series, and is intended to follow the use of *Ten Communities,* it is complete in itself and can be used successfully outside the Series.

Purposes of the Book

Like the other books in the Series, *This Useful World* was written to help boys and girls understand contemporary society. It simplifies the teacher's task because six fundamental steps are taken to bring about an understanding of the part resources play in our life today. These are:

1. **To promote a realization that the earth has resources which man can use to satisfy his needs.** The inter-relationship of human needs and material resources is one of the fundamental themes in this book. In each chapter activities lead the child to examine his own needs in relation to the resource pattern of the region where he lives. He learns that any body of material—soil, water, forest, mine—becomes a resource when it helps human beings meet their needs.

2. **To lay a basis for understanding of the important fact that satisfying a need often results in creating other needs.** For example, the need for swift, economical transportation has been in part satisfied by the automobile and the airplane. The automobile, in turn, sets up a need for good highways and for service stations, while the airplane results in a need for airports and for safe technics of maneuvering and landing—to give a few examples only. The good highway in turn sets up a need for safety devices which will protect the pedestrian. This book makes a special effort to help children understand that throughout human history it has been true that one need leads to another. This is of the essence of progress.

3. **To show that inventions of new tools and technics for satisfying needs often create new problems relating to conservation.** Throughout this book, in the actual text and also in the suggested learning activities, constant emphasis has been placed on the generalization that use of resources is constantly modified by inventions and discoveries. This modification creates new problems in conservation and intelligent utilization. For example: There was no problem of conservation for petroleum before the days of the kerosene lamp, because its chief use was as medicine. The invention of the kerosene lamp stepped up the consumption to an unanticipated volume. But after the invention of the automobile, the enormous quantities of petroleum required for gasoline made the conservation of this resource a matter of major importance.

4. **To show the relationship between man and his physical environment.** This book continually points out that prosperity and culture depend to a large extent upon physical environment which can be expressed in terms of resources, topography, and climate. The ancient civiliza-

tions of the Nile and Tigris-Euphrates were based in part on the fertility of the soil in those valleys. Some striking differences in those particular cultures, such as in buildings, are readily understandable when the resources of the two areas are compared. The coal mines of England were instrumental in causing the Industrial Revolution to develop more rapidly in England than in other countries. Valleys help to determine trade routes and the location of fertile soil. Plains areas are conducive to grazing. Climate, which includes rainfall, length of growing seasons, temperature ranges, and wind directions, plays a part in culture.

For superior groups and for upper grade pupils the teacher will perhaps wish to emphasize still another major aspect of the relation between man and his physical environment. Man accelerates the processes of nature. On the constructive side, it is perfectly obvious that he is able to make two blades of grass or wheat grow where nature would produce but one. But man also accelerates the destructive processes of nature. He farms, lumbers, and mines in ways that result in still further loss of resources. The plowing of grasslands for cultivation and the resulting dust storms, the careless planting of hillside farms with later gullying and eroding, strip mining that leaves the land completely useless, rapacious lumbering with no thought of future growth—all these are examples of the destructive side of the picture. Corrective methods are available, and the book indicates them by pictures of contour plowing, strip planting, selective lumbering, and the like. Suggestions are given for further work along this line, which the teacher can adapt to the capabilities and interests of the class.

5. **To secure an understanding that man's history is a progressive story of his ability to make larger and better**

use of resources. The need for resources and the ability to use them depend on the level of technology attained in a given culture. As man's culture has progressed, he has made more use of resources. The modern American uses many more resources than did either the peasant on the medieval manor, or his lord either, for that matter. Both of these, though, made more use of resources than did their ancestors in prehistoric times. The emphasis in this book on certain periods in man's history is to show man in the process of making his adaptation to his physical environment. The teacher will need to stress with the pupils the fact that this adaptation is a continuous process and that our future progress in large measure depends upon our ability to make larger use, and better use, of our physical resources through better tools and processes.

6. **To point out that social change resulting from newer technics for using resources can be controlled and regulated for man's benefit.** Humanity has within itself the power to control social change for man's benefit. It is perfectly obvious to us today that the horrors of the early Industrial Revolution, with its serious effects on human well-being, were the result of uncontrolled change. Today we are learning that man can control the machine for his own benefit. The point which needs to be emphasized with pupils is that all machines and all resources exist primarily to serve human needs.

It can be seen, therefore, that this book makes an effort to present history, geography, and economics as definitely interrelated aspects of man's ever-continuing attempt to use his resources to provide health, happiness, prosperity, and culture. The authors have provided examples from history, geography, and economics to give the child a starting point in the study of his own regional environment.

Use of the Book

The authors hope that by using this book and engaging in the learning activities suggested the child's concept of his community will be broadened. This broadening comes from the understanding that the local community is but one of many communities which make up a region, and that the world is composed of many regions with similarities and dissimilarities. An essential part of the process of understanding is the child's realization that he uses resources from many regions to satisfy his wants and needs.

It is hoped that the teacher will start this broadening process in some such way as suggested in the learning activities at the end of the first chapter. After the child has made some analysis of his own needs, he may then turn to the book in order to learn how men at other times and in other places have used the rich resources in their environment to satisfy their wants.

Units of work can be set up which focus on the child and his needs. The activities suggested stress the use of the region in which the children live as the environment to be studied. This study enables them to see the relationship between needs and material resources.

The earlier books in the Social Study Series were written to help boys and girls understand and appreciate their own local community. In this way they gained some knowledge of how the work of the world is carried on and needs are satisfied. In this book the emphasis is on the region, the larger community. It is a logical step when the others have been, successively, home, school, neighborhood, local community. Teachers who wish to study regionalism and its relation to present-day culture will find the following books helpful:

American Regionalism by Howard W. Odum (Holt, 1939).

The Role of Education in Utilizing Regional Resources, A Preliminary Report, prepared by Paul Hanna and Harold Hand for the Progressive Education Association (1939).

Geography in Relation to the Social Sciences by Isaiah Bowman (Scribners, 1934).

Every unit of work undertaken with a class may be conceived as having three phases: initiation, development, and culmination.

During the initiatory phase, the teacher needs to present opportunities for experiences which will give the class a common awareness of the issues involved in the problem or topic. The reading material in this book can be used to give this common awareness of a number of problems and topics related to the use of resources. During the initiation of a unit the class uses this common awareness as a basis for setting up both the jobs to be done and the organization of the class for doing the jobs. The entire book may be used to initiate problems dealing with animals, agriculture, minerals, manufacturing, or trade. For example, reading and discussing the material presented in Chapter IV would give the children a common background for studying the soil and plant resources in their region, for learning how those resources can be conserved so that the needs of future generations can be met.

In the developmental phase, the pupils engage in activities which will give them experiences with the primary data of their own environment as well as with secondary data drawn from books, motion pictures, magazine articles, and radio broadcasts. They will again need to draw upon the material in the chapters of this book for

many of the facts needed for developing the unit. During this stage the pupils, working as individuals, or organized as committees or as a total class, are gathering data and evidence and are presenting them for use in the unit. It is in connection with this phase of the unit that the teacher will find the activities at the end of the chapters of particular use.

Finally, in the culminating stage, the pupils' activities help them to draw significant generalizations and reach conclusions. The activities at the end of the chapters will suggest possibilities for culminating activities. Often a culmination may take the form of a public presentation of a display, a panel discussion, or a drama. In the latter part of these notes are given various generalizations which may be drawn from the materials studied. These generalizations can help the teacher guide the pupils effectively in their culminating activities. It is not intended, of course, that these generalizations should be memorized as verbal patterns. They need not necessarily be arrived at in exactly the same form as they are stated here. They do represent, however, the major ideas which can be developed in connection with each chapter and can serve as a useful check list for the teacher in guiding this stage of a unit of work.

To limit the study of *This Useful World* to the information presented in the chapters would be a misuse of the book. This book is intended to present a background of historical, geographical, and economic material which will open up many problems. It will lead children to study in the contemporary world the resources which people today can and do use in satisfying their needs.

The suggested learning activities at the end of each chapter were written with this purpose in mind. In no case was it expected that any teacher would follow these

suggestions in one, two, three order. In many instances several suggestions were made with the same objective in mind so that children would be encouraged to choose rather than to feel that they should do all the things mentioned.

Activities should not be undertaken for their own sakes. They have no value in themselves. It is only in relation to the objectives which the teacher and students consider important that an activity has any value. The authors, in suggesting activities, had certain objectives in mind. These, however, may not coincide with the objectives which a particular teacher with a given group of pupils has set up to achieve during the year. No activity should be undertaken, regardless of its apparent attractiveness, unless it will help boys and girls to grow toward their objectives.

Behaviors to be Developed

The authors have attempted to anticipate the objectives which fifth grade children would consider important and to suggest activities which would help boys and girls to achieve those objectives. They will succeed only if teachers and students find the activities helpful and suggestive. A resourceful teacher and a group of children who have originality and initiative will think of many other activities which they will want to undertake.

The authors believe that children ten and eleven years of age, and even younger, can develop the ability to do reflective thinking if the problems about which they are asked to think are not too difficult. Children can develop the ability to analyze simple problems, they can collect information, organize and interpret that information, and present their findings to the class. They can draw generalizations pointing toward the solution of the prob-

lem, and they can apply generalizations to new situations. These are the steps involved in scientific thinking. Children can take all these steps if the problems and the materials which they are asked to handle are within the range of their abilities and interests.

The activities in *This Useful World* were designed with these abilities and interests in mind. Some of the activities ask children to analyze simple problems such as their needs and the things about their region which they would like to know. In order to collect information, children need to know how to use various sources. Activities are included to help them develop the ability to read with increasing skill; to read and interpret maps, pictures and graphs; to interview; to gather facts through observation and excursions into the community; and to write letters for information which they can not get otherwise. Many activities are suggested for helping them grow in the ability to present material clearly and effectively. The writing of paragraphs, plays, pageants, and stories; drawing and painting; the making of graphs, picture charts, films, slides and diagrams; and activities calling for oral presentation are all included.

The ability to draw sound generalizations and to apply generalizations to new situations is the most important step in problem solving and one which is too often neglected in the classroom. Children should be encouraged to draw sound generalizations and reach conclusions which they can accept; otherwise the problem is not solved, and understanding has not taken place. As stated above, generalizations are not given to children as statements to be memorized and recited, nor is it expected that the generalizations which children draw at the end of a unit of work will be stated in the same terminology as that used by the teacher. However, if the learning

activities have been directed effectively, children should arrive at conclusions similar to the generalizations which the teacher had in mind in planning the unit.

The development of self-respect, creativeness, coöperation, social sensitivity, and responsibility is also considered a desirable objective. A teacher who is concerned with meeting the needs of her pupils will want to provide a happy emotional climate in the classroom where the uniqueness and worth of each individual are recognized and where individual differences are prized and encouraged. Nonverbal as well as verbal activities are included in the suggested learning activities so that children who are adept at working with their hands, but who have difficulty in expressing themselves in words, will find activities in which they can excel and at the same time make a contribution to the group's understanding of the world in which they live. This sense of achievement, of feeling important and necessary to the group is a fundamental need of all children. A satisfaction of that need is essential to the development of self-respect. Other faculties are developed by working together in a happy classroom situation on an activity in which all are interested. Boys and girls learn to give and take criticism from each other, to exercise self-control, to recognize the contributions which others make to the group, and to develop the power of self-discipline and self-direction.

Creative experience helps boys and girls to understand and appreciate the world about them. Children like to express their individuality through creative writing, art, music, poetry, dramatics, inventions, craft, design, and scientific discovery. They enjoy the satisfaction of doing something well and of making a contribution to the appreciation and understanding of others. Through creative experience the child grows in his ability to appre-

ciate his environment, to enjoy art, music, and literature, to use language more effectively, and to be original and resourceful in expressing his ideas and emotions.

Many of the learning activities call for group work, for children need many experiences which will help them to develop the ability to work well with others on a group enterprise. Through committee work and group projects boys and girls learn to recognize the rights of others, to share responsibility, to carry out tasks without grumbling or complaining, to assume leadership in one situation and the role of followers in others, to carry their share of the project but not to monopolize a program or dominate a situation. Through such activities children come to the realization that social progress is possible only through group coöperation and that more can be accomplished when people work together than when they work separately or in opposition to each other.

Children who are developing as effective citizens in a democracy and living democratically in all their school relationships are sensitive to the rights of others; treat all children and older people with equal courtesy and respect, regardless of religion, nationality, or economic status; are aware of the effect of their actions on other people; are sensitive to the welfare of the group; and are willing to sacrifice their own personal advancement in the interests of the group's welfare. Children who are growing in social sensitivity should also develop an awareness to social inequalities in the world around them and a desire to correct these social ills. Some of the activities were designed to give children not only an opportunity to investigate and study conditions in their region but to plan and perhaps carry out, within the limits of their ability, ways and means for correcting some undesirable conditions.

Citizenship in a democracy carries with it responsibilities as well as privileges. Children growing up in a democracy need to have many opportunities for growing in responsibility. They need opportunities to think through, plan, and execute individual and group problems. They need to learn that the privilege of participating democratically in the planning and carrying out of a project carries with it the responsibilities of completing a task undertaken, of meeting their obligations promptly and to the best of their ability, and of accepting the consequences of their own actions. Committee work, individual projects, and group undertakings are thus included, and choices of such means are offered, so that children will have an opportunity to learn to work together, to assume leadership, to recognize the rights of others, to carry their share of the project, to achieve on their own initiative, and to develop resourcefulness, self-reliance, and self-control.

Understandings and Generalizations

Growth in the understanding of the facts and principles about physical environment and man's adaptation should take place. This is a result of the study of the rich material contained in this book and, as is suggested in the learning activities, a study of the region in which the child lives. Teachers should help children get a clear understanding of the concepts necessary for a better understanding of the world and its resources, and man's utilization of them. Following is a list of generalizations included to help teachers select the subject matter and content material to be taught. Although the list is not complete, it should suggest to teachers important learning experiences for their pupils.

Generalizations

Chapter One

THE OLDEST WAY TO MAKE A LIVING

1. Nature has supplied us with many resources which can be used in satisfying our needs.

2. Man makes use of natural resources according to his knowledge and his needs.

3. History shows that men have become more and more dependent upon each other for the satisfaction of their needs.

4. Because men today use resources of the entire world in meeting their needs, they have become interdependent. This is very different from primitive times when man found everything in his immediate environment.

Chapter Two

THE HUNTER

1. Inventions and discoveries have made it possible for men to make greater use of natural resources in meeting their needs.

2. As people's needs and desires have increased, ways have been found to satisfy them.

3. The discovery of ways to make and use fire was one of the greatest man ever made.

4. The natural resources of a region have a great deal to do with the way the people of that region live.

5. Water, which covers three-fourths of the earth's surface, greatly affects weather and climate.

6. The climate, and the animal and plant life of a region affects the way the people of that region live.

7. Hunting, as a means of making a living, is possible only where there is an abundance of land and certain natural resources.

8. Conservation of fish and game resources of the world is necessary if we are to continue to have sufficient fish and game to supply the world's demands.

9. The domestication of plants and animals not only made possible the breeding of better animals and the cultivation of better plants, but it changed man's ways of living.

10. Man depends on animals and plants to supply him with clothing and food.

11. The kind of houses men build depends to a great extent on the kinds of materials found in the region and upon the climate of the region.

12. As man has become more civilized, the variety of things he needs and wants has increased enormously.

Chapter Three

THE HERDER

1. Semi-arid lands the world over are used for grazing.

2. The domestication of animals marked a step forward in man's progress from savagery to civilization and changed his life in many ways.

3. The domestication of animals affected men's ideas about the value of property and the rights of an owner.

4. The domestication of animals made it easier for families and clans to live together than in hunting cultures. Among the advantages obtained was an easier and more certain transfer of group knowledge and experience from one generation to another.

5. Animals have long been used by men as beasts of burden and as a source for food and clothing.

6. Marginal land which is unfit for farming may often be used profitably for grazing.

7. Grazing makes more efficient use of land, from the standpoint of productivity, than does hunting.

8. In countries using simple tools and technics, animals are still used as beasts of burden, but in many countries animals are being replaced by machines.

9. Many animals are the friends and pets of man.

10. Government inspection protects men from diseased meat and impure milk.

11. Agricultural experiment stations, maintained at government expense, have helped in the improvement of stock and the eradication of pests.

Chapter Four

THE FARMER

1. Man took a great step forward in human history when he began to grow plants to meet his needs.

2. The use of land for the growing of crops increased man's sense of ownership.

3. The use of land for crops led men to settle in communities for mutual protection and help.

4. The early villages which grew up in farm communities often became centers for trade, manufacture, and education.

5. In the past, many farm communities were entirely self-supporting and needed nothing from the outside world.

6. At the present time, practically all communities depend upon each other for meeting the needs of their people.

7. Plants help to meet human needs not only for food but also for shelter, clothing, and recreation.

8. People who live in cities are dependent on farms and forests for their food, shelter, clothing, and recreation.

9. Compared with grazing, farming is a more productive use of the land. However, some land is more suitable for grazing than for farming, just as some land is better for forests than for farms.

10. Men are learning to make adjustments so that their use of the land disturbs the normal processes of nature as little as possible.

11. The development of new methods of farming has released farm workers for work in other lines. We are in the process of changing from a farm civilization to a city civilization.

Chapter Five

THE DIGGER

1. The earth's crust has many minerals—solid, liquid, gaseous—which can be used by man to provide for his needs.

2. Minerals differ from plants in two important respects: (a) they are limited in quantity, and (b) they cannot be deliberately cultivated.

3. Iron has been the most important metal in the history of mankind.

4. Because of unequal distribution throughout the world, the use of mineral resources in any given region has not been particularly dependent on the needs and wants of the people of that region.

5. Inventions and discoveries have brought about

changes in the use of various minerals, in both amount and kind.

6. Mineral resources of a region affect the life of the inhabitants. In some cases the ways of life are affected by the transportation which brings minerals from other regions.

7. As education gives man new wants and needs, he will make more use of mineral resources and will invent new ways of finding mineral deposits and taking them from the earth's crust.

8. In the past, factory districts have usually been found near places where there were deposits of coal and iron ore.

9. The discoveries of mineral deposits have caused shifts in population.

10. Because the supply of minerals cannot be increased as supplies of animal and plant substances can be increased, conservation is of prime importance.

11. The need for some minerals may be modified by inventions that make possible the substitution of plant and animal resources.

Chapter Six

THE TRADER

1. Differences in climate and in natural resources of regions have led people to trade in order to satisfy their needs.

2. A region is likely to export those things which it can produce to advantage and import those things which it cannot produce or can produce only at great expense.

3. The circulation of money is dependent upon the willingness of people to accept it.

4. Money is convenient as a medium of exchange in all except the simplest transactions.

5. Trade and transportation tend to follow natural highways.

6. As long as trade channels are kept open and people are able to buy and sell in a relatively free market, they can obtain the resources they need by means of trade.

7. Oceans, lakes, rivers, and valleys have served as highways of the world from earliest times down to the present.

8. Rapid and safe transportation and communication have had the effect of bringing far distant regions closer together.

9. Increased facilities of transportation have tended to spread the use of products.

10. Good government helps trade by building and maintaining highways, keeping trade lanes free and open, and by maintaining sound money.

11. Without a surplus of production, trade could not take place.

12. Trade makes possible a higher standard of living than most regions could maintain if they attempted to be entirely self-sufficient.

13. Important factors in city location are sites close to necessary natural resources and sites at geographical points advantageous for trade.

14. People learned to coöperate in order to achieve their goal or for mutual protection.

15. Civilization has been spread and knowledge disseminated by traders ever since the time of the Phoenician sailor-traders.

Chapter Seven

THE MAKER

1. Most plant, animal, and mineral resources have to be changed or made over in some way in order to be useful in meeting man's needs.

2. Early in history some people began to specialize in making things.

3. From the time of ancient Egypt through the first part of the 18th century, tools and hand-work methods of making things remained practically the same.

4. Since the 18th century, continuing in the present, there have been many inventions giving us new tools and methods of making things.

5. These changes in tools and methods of making things have brought about important changes in family life, vocations, recreation, education, and the arts.

6. Whether or not a given region has many factories depends on human and natural resources, power supply, transportation facilities, and the needs and wants of the people.

7. Machines bring about social change, and this change can be controlled so that the change will be for the better.

Chapter Eight

A WORLD OF USEFUL THINGS

1. Resources for meeting human needs include not only raw materials from plants, animals, and minerals, but also certain things made from these materials as well as the skills and intelligence of human beings.

2. No region in our country is self-supporting, for each depends in some way on other regions.

3. Everything which exists may some day become a resource in meeting some human need.

4. Man's intelligence is resulting in new inventions of materials which may replace some of our present resources when these are used up or badly depleted.

5. The use of resources in a region depends on the needs and wants of the people of that region, inventions in that region, transportation and communication within the region and to outside regions, the presence of factories, and the education carried on in that region.

6. Education is a great stimulant for creating new needs and wants, and these needs and wants in turn produce inventions calling for the use of more and new resources.

7. Social and material changes are constantly taking place as a result of the needs and wants of mankind. These changes can be controlled to bring about better health, happiness and well-being for all.

The Use of Visual Material

Visual material and the text

There is an ample supply of motion-picture material available for use in connection with the work covered in Chapters 2, 3, 4, and 5 of *This Useful World.* These films can be used to advantage in introducing the units of work following these chapters. They will also serve as a source of additional information in developing the units. In connection with the remaining chapters it would be advantageous to use the films as a basis for summarizing the work or for culminating the unit.

It should be stressed that this visual material, like the material in the text, should in no way replace the child's direct experience with his regional environment. The text, plus the visual material used, provides the basis for initiating such experience, for supplementing and developing it, and for drawing from it the necessary significant understandings and generalizations. Text and visual material are, however, not *substitutes* for the experience itself. But when direct experience with the environment is not possible, then the use of motion pictures will be of genuine help.

How films may be obtained

In many schools where there is equipment for showing motion pictures, the teachers fail to profit from it simply because they do not know where or how to secure films.

Ways in which films for school use may be obtained:

1. By purchase. This is desirable when the value of a film has been demonstrated and it is to be used again and again. No film should be purchased without a preview, and its usefulness, reliability, and appeal should all be carefully considered.
2. By rental. Many films rent for a price that will be out of reach for the average school with a small appropriation for such purposes. There is, however, a very large number of excellent films that can be rented at small cost.
3. By loan. Free films can be obtained from many sources, the only expense to the exhibitor being the payment of transportation charges.

Commercial producers and distributors of films

It would be impossible in the space available here to list all the places where educational films may be rented or purchased. It is suggested that the teacher send for the following catalogs which will be found most helpful:

1. *1000 and One.* This catalog contains an extensive list of producers and distributors as well as a long, classified list of the best educational films. It is published by *The Educational Screen,* 64 East Lake Street, Chicago, Illinois. (Price, $.75)
2. *The Educational Film Catalogue.* This catalog contains a classified list of non-theatrical films. It is published by H. W. Wilson, 950 University Ave., New York City, New York. (Price, $2.00)

Non-commercial sources of motion-picture material

1. Many state departments of education and also state universities now maintain a visual-education service from which films for school use may be rented at a very reasonable rate. The teacher should write her state department of education

and also her state university for catalogs of their film libraries. She might also write to the state department of education and to the state university in neighboring states.

2. The United States Department of Agriculture distributes films free of charge in most parts of the United States. Application should be made through the county agent. In Oregon, Washington, Idaho, Montana, and Wyoming, however, application should be made to the Oregon State College, Corvallis, Oregon. In California, Nevada, Utah, and Arizona, application should be made to the University of California at Berkeley.
3. The following also distribute films: the United States Bureau of Mines, Experiment Station, Pittsburgh, Penn.; the United States Bureau of Reclamation, Washington, D.C.; the United States Department of Labor, Women's Bureau, Washington, D.C.; the United States Department of the Interior, National Park Service, Washington, D.C.
4. A number of museums have films for distribution, as, for instance, the Buffalo Museum of Science, Buffalo, New York, and the American Museum of Natural History, New York City, New York. The teacher might address inquiries to museums in cities nearby, concerning their film libraries.
5. Many industrial firms, as, for example, the General Electric Company and the Ford Motor Company, have for distribution excellent films of manufacturing and industrial processes. It would, however, be wise for the teacher to ascertain whether or not the use of such advertising material will be objected to.

A suggested list of pictures

For the convenience of the teacher, a list of pictures useful for showing in connection with the presentation of Chapters 2, 3, 4, and 5 has been compiled. The pictures listed are drawn largely from the following sources:

(a) Erpi Classroom Films, Inc., 35-11 35th Avenue, Long Island City, New York. The Erpi selection consists entirely of sound films sold at $50.00 a reel, minus a 10% school discount.

(b) Eastman Kodak Company, Teaching Films Division, Rochester, New York. The Eastman films consist of silent films sold at $24.00 a reel.

(c) The United States Department of Agriculture, Office of Motion Pictures, Washington, D.C. The films of the Department of Agriculture are sold at approximately $4.50 a reel.

Chapter 2

Big Game and the National Forests. One reel, silent. U. S. Dept. of Agr.

Elephants. One reel, sound. Erpi.

Shell Fishing. One reel, sound. Erpi.

Our Earth. One reel, sound. Erpi.

Our Wild Life Resources. Two reels, silent. U. S. Dept. of Agr.

Trapping Tuna. Canadian Govt. Motion Picture Bureau, Dept. of Trade and Commerce, Ottawa, Ontario, Canada. Write to this office for list of United States distributors.

Wild Fowl Conservation. ½ reel, sound. March of Time.

Chapter 3

Animals in Modern Life. One reel, sound. Erpi.

Cattleman, The. One reel, sound. Erpi.

Farm Animals. One reel, sound. Erpi.

Game Bird Farming. One reel, silent. Dept. of Agr.
Goats. One reel, sound. Erpi.
Horse and Man. One reel, silent. Dept. of Agr.
Poultry on the Farm. One reel, sound. Erpi.
Rabbit Farming. Two reels, silent. U.S. Dept. of Agr.
Range Sheep. One reel, silent. Eastman.

Chapter 4

Caravans of Progress. (changes in farm machinery) One reel, sound. Apply directly to the International Harvester Co., Inc., 180 N. Michigan Avenue, Chicago, Illinois.
Corn. One reel, silent. Eastman.
Corn Farmer, The. One reel, sound. Erpi.
Cotton Growing. One reel, silent. Eastman.
Flax to Linen. One reel, silent. Eastman.
Forests Serve Man. One reel, sound. Dept. of Agr.
Four Thousand Gifts of the Forest. One reel, sound. U. S. Dept. of Agr.
Grassland. One reel, sound. U. S. Dept. of Agr.
Irrigation Farming. One reel, sound. Erpi.
Lumbering in the Pacific Northwest. One reel, silent. Eastman.
Orange Grower, The. One reel, sound. Erpi.
Our Daily Bread. ½ reel, silent. U. S. Dept. of Agr.
Reforestation. One reel, silent. Eastman.
Stop Forest Fires. One reel, sound. Dept. of Agr.
Truck Farmer, The. One reel, sound. Erpi.
Water Cycle, The. One reel, silent. Eastman.
Wheat. One reel, silent. Eastman.
Wheat Farmer, The. One reel, sound. Erpi.

Chapter 5

Copper. One reel, silent. Eastman.
Gold. One reel, silent. Eastman.
Lead. One reel, silent. Eastman.

Salt, Common. One reel, silent. Eastman.
Sand and Clay. One reel, silent. Eastman.
Silver. One reel, silent. Eastman.

Picturols or film strips

A picturol is a strip of 35 mm. still pictures which may be projected one at a time through a 35 mm. picturol projector. Each set (strip) consists of about 50 pictures and can be wound up into a roll of about 1½ inches in diameter and kept in a small can. Picturols are put out by the Society for Visual Education, 327 South LaSalle Street, Chicago, Illinois.

It is recommended that these picturols be previewed before purchase. If this is not possible, only one roll should be purchased on a trial basis in order to be certain that the picturol meets the needs of the children.

The picturol sets dealing with regional geography and with minerals will be found of special value in connection with Chapters 2 and 5 of *This Useful World.* A list of these sets is supplied below. It will be noticed that the regional divisions portrayed in the films do not correspond exactly to the regional divisions as set forth in the activities for Chapter 2.

Chapter 2

New England
Atlantic Coastal Plain
Appalachian Highlands
Gulf Coast Lowlands
Corn Belt
Great Lakes
Mississippi Valley
Great Plains
Rocky Mountains
Desert Regions
Pacific Northwest
California

Chapter 5

Aluminum
Copper
Gold and Silver
Iron and Steel
Lead
Zinc

Index

A *d* before a page number means that there is a diagram on that page; an *m* before a page number means that there is a map on that page; a *p* before a page number means that there is a picture on that page.

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